

DIVEAHOLIC

BUYER'S GUIDE 2015

SCUBADIVER
AUSTRALASIA

SD Issue 1/2015 AA No. 81

R E A D M O R E, D I V E M O R E

+ **20 REASONS WHY ASIA PACIFIC HAS
THE BEST DIVING IN THE WORLD**

+ **ALERT DIVER**
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*Speakers subject to change



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ALSO FEATURING

Ernest H Brooks II Guest Judge (USA), **Bob Hollis** VIP Guest (USA), **Laurent Ballesta** (France), **Pierre-Yves Cousteau** (France), **Gianluca Genoni** (Italy), **Aaron Wong** ADEX Ambassador of Photography, **A.G Sano** (Philippines), **Alex Santos** (Philippines), **Casey McKinlay** (USA), **Daren Marshall** (Australia), **Dave Ross** (Philippines), **David Strike** (Australia), **Dharshana Jayawardena** (Sri Lanka), **Gideon Liew** (Singapore), **Henry Jager** (Switzerland), **Imran Ahmad** (Singapore), **Leslie Leaney** (USA), **Michael AW** (Australia), **Michael Maes** (Belgium), **Michael Menduno** (USA), **Mike Bartick** (USA), **Mike Vietch** (Canada), **Paul Toomer** (UK), **Paul Trainor** (New Zealand), **Richard Taylor** (New Zealand), **Shawn Heinrichs** (USA), **Simon Pridmore** (UK), **Tim Ho** (Malaysia), **William Tan** (Singapore), **Wu Lixin** (China)

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+
The groundbreaking documentaries, *Blackfish* and *The Cove*

*All screenings subject to change



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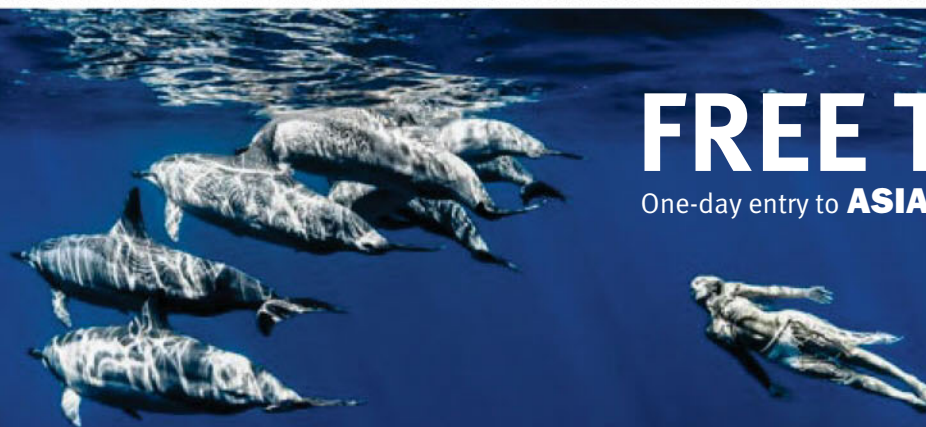
Medical Support Group



Supporting Media



Photo: Shawn Henrichs



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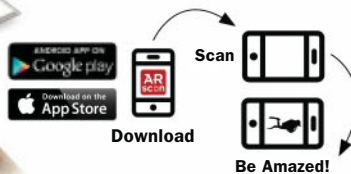


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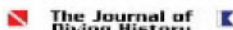


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FROM THE EDITOR

I've often wondered what it is about diving that makes it so addictive. Is it the smell of the neoprene and silicone? The lifestyle? Or maybe we all get a bit hooked on the little hits of narcosis that most of us don't even notice?

But perhaps it's simply the bliss of communing with our planet's huge bodies of water. Does anything ever come close to that special silence that hits as you sink below the surface? That quiet and creeping sense of wonder as you immerse yourself in another world, with the chance of magical encounters with all sorts of denizens of the deep? Probably.

Whatever it is, we are proud to be the pushers of this beautiful "drug" and so we happily present you with everything you need to get your diving fix in 2015.

We think that Asia Pacific's diving really is the best in the world, and we have given you just 20 of the hundreds (thousands?) of examples that back up this bold claim. We've also put together a comprehensive list of dive operators that can get you out there to see all of this undersea wonder for your self.

And of course, we've scoured the world of gear and gadgets to bring you the newest and best (read: most coveted-worthy) equipment for 2015.

You might want to laminate this one and stick it on your reference shelf. I guarantee you that will be flicking through it, with cravings, for the rest of the year.

Alice Grainger
Editor

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20 REASONS WHY DIVING IN ASIA-PACIFIC IS THE BEST IN THE WORLD

50 + Probably the Best Shark Dive in the World!

By Warren Baverstock

Find *Alert Diver* facing page **64**, packed with essential information from the Divers Alert Network Asia-Pacific – the experts in dive safety, training and accident management



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Catch the
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BLACKFISH,
THE COVE



VALERIE TAYLOR presents **BLUE WATER WHITE DEATH**

The Honourable KROV MENUHIN & LESLIE LEANEY present
THE WORK OF PROFESSOR HANS HASS

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BORNEO: THE GHOST OF THE SEA TURTLE

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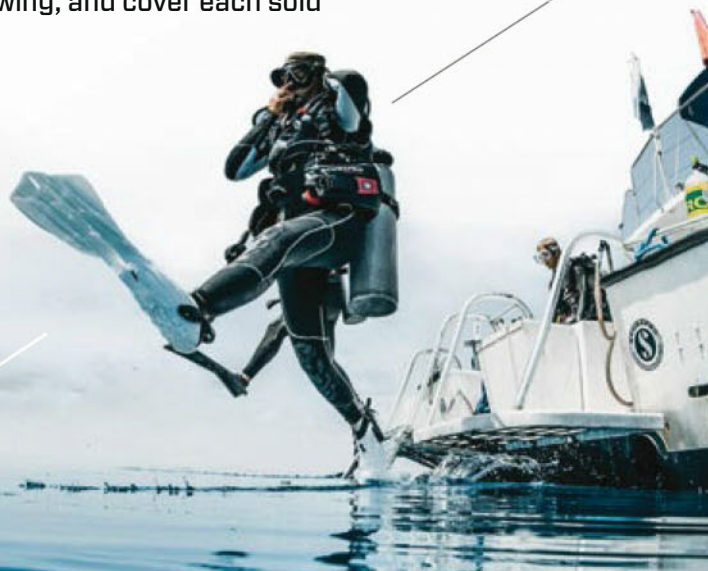
SCUBAPRO



X-TEK SIDEMOUNT SYSTEM

SCUBAPRO'S modular design and compact independent air cell, developed in co-ordination with leading side-mount cave divers, provides guaranteed quality and a configuration for every diver's needs. Harness, 20 L life wing, and cover each sold separately.

- 1680 DEN Ballistic Nylon outer shell and 420 DEN Nylon inner bladder
- Delivered with standard SCUBAPRO BPI inflator



BUYER'S GUIDE

Ok. The wait is over. Getting your underwater fix is going to be even easier in 2015 with all of this awesome gear. Kit your self out from head to toe in the very latest and best.

MASKS

MARES I3 SUNRISE

The I3 combines the advantages of the Tri-comfort skirt with a huge field of vision. The central glass has been teamed with smaller side panels to create an impressive peripheral view that will blow you away. The X-shaped strap and quick adjusting buckles allow for great fit and effortless adjustment.

MSRP USD 80



IST SPORTS M300 SYKLOPS

Having problems finding a mask wide enough to fit your face? The M300 Syklops is designed for you. We also dig this mask's durability; its tough aluminium frame ensures it can take quite a bit of beating.

MSRP USD 90



MARES X-VISION LIQUID SKIN

A revolutionary new design offers a huge 20-percent increase in vision and uses small horizontal ribs to distribute pressure evenly over the face. The skirt has been restyled for even greater anatomical fit and is available in both mono-silicone and bi-silicone versions in a vibrant new mix of colours.

MSRP USD 120



GULL MANTIS LV

We must admit, we do like this whole UV lens business. If you agree, go for Gull's low volume Mantis LV mask; the UV400 Cut lens blocks about 98 percent of ultraviolet radiation, and the mask's skirt design ensures little to no post-dive impressions on your face.

MSRP USD 150



All prices are intended as guide prices only and may vary according to dealer, country and exchange rates



AERIS CYANEA

No wonder they say Aeris has vision. This super-soft liquid silicone skirt offers an incredible fit, while its ultra-clear lenses give you a wide field of sight. The real innovation however, lies with the mask's ski-goggle strap, which is not only easy to adjust, but also won't pull on your hair. MSRP USD 120



SUBGEAR SPRITE

This one's for the ladies. The Sprite is one pretty lil' mask, but it also performs as well as it looks. A super low volume mask with a large field of vision, we give this one an A+ for comfort because of its ultra soft silicone. The push-button strap adjustment is definitely an added bonus. MSRP USD 54



BEUCHAT MAXLUX S

An unrivalled field of vision from the Maxlux S. This compact, rimless mask is also incredibly comfortable thanks to the micrometric adjustment buckles situated on the hypoallergenic silicon skirt. Available in black, green, brown and blue. MSRP USD 65

DIVER

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DIVE RITE®

EQUIPMENT FOR SERIOUS DIVERS





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FINS

Power over frills. Despite their compact size and light weight, the Accels deliver a top-of-the-line performance regardless of your kicking style. That, combined with their unique, high-stretch strap design and affordable pricing means these little beauties have earned their place as top-sellers. MSRP USD 100



AERIS ACCEL

MARES AVANTI QUATTRO+

The iconic Mares Quattro fin has been restyled making it unparalleled by its competitors. The ingenious bungee strap delivers advanced durability and ease of use. Mares have also increased the fins' efficiency with a new high-flex material offering greater response and thrusting power than ever before. MSRP USD 170



MARES X-STREAM

More than two years of research and development have gone into perfecting the exceptional X-Stream from Mares. This high performance fin uses the latest advances in technology and materials to achieve comfortable, lightweight and efficient movement. The X-Stream is truly a leap into the future. MSRP USD 190



CRESSI ARA WITH EBS ELASTIC BUNGEE SYSTEM

The ARA EBS fins are the thoroughbreds of the Cressi range of open-heel fins: Extremely lightweight with an excellent effort to propulsion ratio, no matter the kick. The EBS strap is designed to meet the needs of the most demanding divers. For comfort and practicality, the bungee system makes donning easy, even with thick or three-fingered gloves. This fin is designed for scuba professionals, instructors and technical divers who will appreciate its efficiency. MSRP USD 189



DIVE RITE XT FINS

These rugged looking fins provide power performance, without the weight of conventional power fins. Made out of monoprene material, the XTs give just the right amount of snap to propel you through the water further, with fewer kick cycles. Stainless steel buckles ensure that these fins will survive any environment. MSRP USD 165



SCUBAPRO SEAWING NOVA GORILLA

The award-winning Seawing Novas have been fine-tuned to provide more stiffness and snap, giving you more power, more speed, and even better frog-kick ability. The Gorilla is ideal for those diving in demanding conditions. MSRP USD 224





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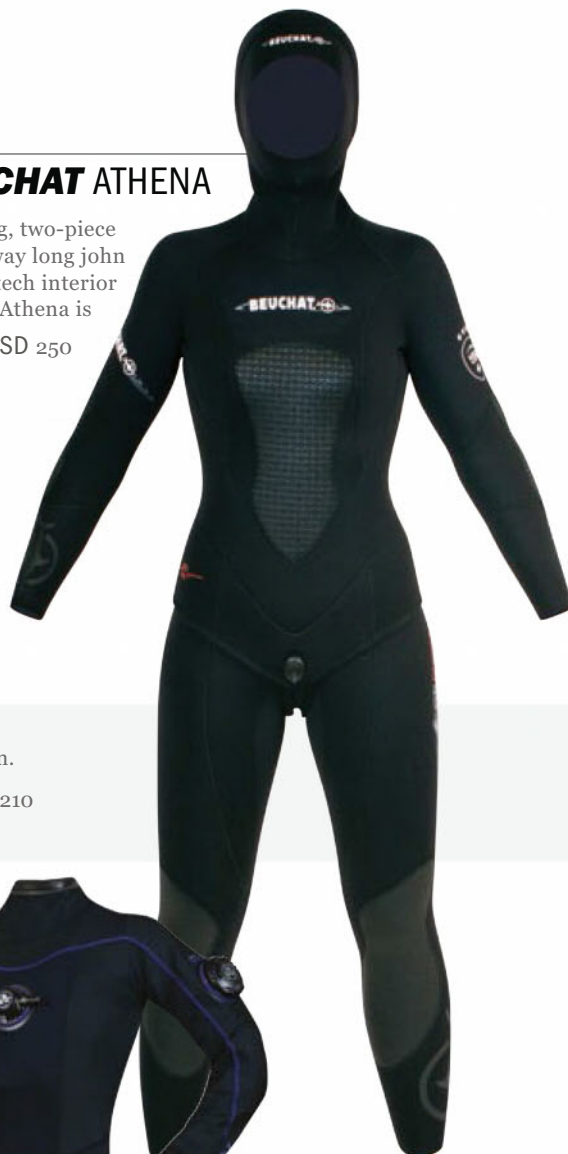


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THERMAL PROTECTION

From the inventors of the first isothermal suit comes a hard-wearing, two-piece wetsuit designed especially for women – a hooded jacket and cutaway long john with Velcro straps, all made of soft Elaskin neoprene with a high-tech interior for maximum warmth, and reinforced in all the right places. The Athena is available in 5mm and 7mm, for freediving and scuba. MSRP USD 250

BEUCHAT ATHENA



BEUCHAT SMARTSKIN

An incredibly versatile, neutrally buoyant suit that can be worn alone or as an undergarment. Made of three layers, the Smartskin really is smart, helping to regulate body temperature by being 100-percent windproof, breathable and quick drying with UPF 50+ UV protection.

MSRP USD 210



FOURTH ELEMENT PROTEUS

The sleek Proteus offers outstanding thermal protection and comfort.

Incorporating the unique “Hydrolock” neck seal, glideskin seals at the wrists and plasma seals at the ankles, the design eliminates almost all water ingress and prevents flushing.

MSRP USD 335



AQUA LUNG FUSION

Whites Fusion drysuits have been rebranded and are now fully part of the Aqua Lung family. These innovative suits now boast Aqua Lung’s market-leading styling.

They’ve also added a few new tweaks to some models, such as zippers on the ankles of the bullet suits for fast drying.

MSRP FROM USD 1,000



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MARES FLEXA THERM

You want to be super-warm underwater? Check out the Flexa Therm, which offers 6.5mm of advanced thermal protection with a Masterseal zip to minimise water flushing. Made from soft and flexible ultra-stretch neoprene, the suit uses a horizontal rear opening to make donning and doffing a cinch. MSRP USD 690

SHARKSKIN CHILLPROOF & CLIMATE CONTROL

Protect yourself from the sun, the wind and the cold with a neutrally buoyant thermal garment with awesome insulating power. The secret is the triple layer of high-tech fabric; fleece next to the skin for warmth, a wind-proof middle layer, and an anti-abrasive outer layer. Sharkskin keeps you warm both underwater, and once you get out.

Mix and match to tailor a combo that suits you; choose from full suits, separate tops and bottoms, vests and even hats! MSRP FROM USD 130

SCUBAPRO SEAMLESS GLOVES

Featuring heat taping instead of seams for a soft, lightweight glove. Made of 2mm neoprene with great insulation and a printed palm for grip. MSRP USD 49

SCUBAPRO EVERFLEX

Scubapro's 100-percent Everflex suits, in 7/5 mm, 5/4mm and 3/2mm, made using exclusively X-Foam neoprene formula, have been completely redesigned with fewer panels and seams, allowing maximum stretch capacity for extreme freedom. MSRP USD 383

WATERPROOF W-SERIES OVERVEST

Struggling to stay warm in the water? This Waterproof Overvest should do the trick. It's 5mm of superior grade neoprene combined with Waterproof's special knitted lining and the HAVS hood technology. To be worn with the W1, W2, W3, W4 and W30 wetsuits, or if you prefer, on its own as a shorty. MSRP USD 158

WATCHES

BLANCPAIN OCEAN COMMITMENT BATHYSCAPHE CHRONOGRAPHE FLYBACK

This piece reflects 60 years of Blancpain's legendary Fifty Fathoms diving watch tradition. A fully featured underwater chronograph featuring Blancpain's latest in-house movement, the F385, with each second perfectly divided into 1/10th of a second intervals. Two other features bring important functionality to the world of diving: Sealed chronograph pushers allow use of the chronograph during dives to a depth of 300 meters; and the chronograph itself incorporates a flyback function that is particularly useful for decompression stops. A beautiful, functional timepiece for the most serious divers, marking an important milestone in the history of one of the world's greatest watchmakers.

Every owner will be enrolled in the Ocean Commitment Circle, with the advantages that membership entails, and becomes an active player in reinforcing Blancpain's support of oceanic initiatives. Only 250 are available.



MSRP USD 21,495



ORIS AQUIS DATE ORANGE

The latest in a line of high-functioning diving watches. The orange accents on the bezel insert, indices and nickel hands result in a diving watch with a highly visible display underwater, enhanced by its sapphire crystal window. The stainless steel, 43mm case is water resistant to 30 bar (300 meters), and the adjustable sliding sledge clasp allows the watch to be adjusted while it is being worn. It's this kind of attention to detail that makes Oris one of the leading manufacturers of precision diving watches.

MSRP USD 2,030

PANERAI LUMINOR SUBMERSIBLE 1950 CARBOTECH 3 DAYS AUTOMATIC

The technology of the future in a classic watch. The original case design was developed by Panerai in the late 1940s to be worn on the wrists of commandos of the Italian Navy, but has been enhanced by a rotating bezel inspired by the model created by Panerai for the Egyptian Navy in 1956. But this timelessly-rugged watch presents a remarkable new technical innovation – a case made of Carbotech, a composite material based on carbon fibre, never before applied to the world of watchmaking. Tested for water-resistance up to 300 metres. The Luminor Submersible has a power reserve of three days, and with a titanium back, it truly is a watch fit for the most demanding divers.



MSRP USD 19,000

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Guide is full of riveting content
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BCDS

BEUCHAT MASTERLIFT ADVENTURE

A sturdy, no-fuss jacket: Anatomically shaped bladder in 420 denier nylon with adjustable cummerbund and chest straps, integrated weights, left and right handed octopus and pressure gauge housing, and two large, easily accessible, single zippered pockets.

MSRP USD 350



HOLLIS L.T.S.

Weighing in at only 2.27kg, it's no wonder its name stands for "Light Travel System". Designed for diving in tropical waters, this lightweight BCD provides around 14kg (30lbs) of lift and features a rugged 1000D nylon outer cover a 420D internal bladder, a 2.2kg (5lb) dumpable weight system and sufficient D-rings for all your accessories. Looks like less is more after all. MSRP USD 450



HOLLIS SMS75

New from one of the leaders of the sidemount market, this wing is designed to promote proper trim ("horizontal" diving) with increased lift towards the hips where it's needed most. The SMS75 will also support rear mounted tanks and reversible inflator positions. This wing is an evolution that combines the technical capabilities of the SMS100 with the lighter weight of the SMS50 to offer a system that's perfect for diving everywhere from the narrow confines of a cave to the vastness of the open water. MSRP USD 700



MARES PRESTIGE 2

This favourite of the Mares range has been given a cosmetic facelift but still retains all the features users have come to love. With swivelling shoulder straps, excellent lift capacity, 3D pockets and Mares' renowned MRS weight integration, this new model is even more ergonomic than ever before.

MSRP USD 650



MARES HYRID PRO TEC

The Hybrid Pro Tec offers a new level of comfort. This sturdy, durable jacket allows for perfect fit and comfort thanks to features like padded shoulder straps, lumbar suspension and MRS weight integration. It also gives you 10 metal D-rings, three of which are customisable. The modular design means you get two jackets in one – the detachable vest comprising the MRS plus system is removable, leaving a lean-and-mean travel BCD. MSRP USD 690

SCUBAPRO EQUATOR

The Equator is extremely comfortable and fully adjustable. It comes with an integrated weight system and a wide range of great features. Its compact and lightweight design makes it an ideal front-adjustable BC for diving at home and abroad. MSRP USD 638



DIVE RITE TRANSPAC XT

The TransPAC XT is a modular harness that grows with your diving. Based on a mountaineering backpack design, the TransPAC XT gives optimum comfort in and out of the water. Modularity allows for easy addition of quick release weight pockets, storage pockets, and other accessories.

MSRP USD 360



DIVE RITE NOMAD LTZ SIDEMOUNT SYSTEM

Evolving for a superior performance, the Nomad LTZ is a streamlined, sidemount-specific BC designed for any environment. With 16kgs (35lbs) of lift, the LTZ can accommodate a variety of tank sizes. Two relief valves and the inflation hose are routed on the inside of the BC, safe and free from exposure, creating a clean skid plate on the back. With additional lift typically needed toward the lower back when sidemounting, the combination of shape and contour of the bladder creates this lift, achieving the optimum trim. MSRP USD 579

AQUA LUNG PRO HD

A wrap-around jacket that boasts the ever-reliable Surelock II weight release system, this integrated BCD has been "up spec'd" with technologically advanced, fade- and abrasion-resistant material. Feature-rich with five stainless D-rings and large utility pockets, this BCD is ready to host all the accessories you could ever need. MSRP USD 480



DIVE RITE TRAVEL XT WING

The Travel XT Wing is Dive Rite's most durable and streamlined aircell. Designed for a single tank and warm water diving, the Travel XT provides 11.3kg (25lbs) of lift. Featuring Dive Rite's patented SuperFabric material on the back panel, this BC has an armoured shell protecting it against punctures and abrasion. MSRP USD 380



REGULATORS

APEKS BLACK SAPPHIRE

Celebrating 40 years of excellence, this limited edition anniversary regulator has a redesigned XTX 200 body with sleek but sharp lines. With the added tough but luxurious PVD finish, metallic front cover and fifth port extension this truly is a piece of diving history. MSRP USD 1,080



AQUA LUNG CORE

This new addition to the Aqua Lung family builds upon the ever popular Titan LX. With Aqua Lung's reputable quality and an auto closure device that seals the first stage as soon as it is removed from the tank, the new Core is one of the most feature-rich, value driven regulators on the market. MSRP USD 540



BEUCHAT VRT 90

The latest offering from Beuchat, designed for temperate and cold water diving. This French-made beauty is compact and efficient, fitted with Beuchat's patented anti-frost system and Venturi control, a balanced diaphragm, 4 MP and 2 HP ports configured to deliver high flows at great depth, and a large, easy to find purge button. MSRP USD 360



CRESSI T10-SC/MASTER

This first stage stands out from crowd with its mechanism arranged on an axis perpendicular to the axis of air entry, creating a "T" shape. The advantages of this particular design include better arrangement of the hoses and the configuration occupying less space (especially in SC versions for cold water). The Master Ellipse second stage boasts the proven Cressi balanced valve to ensure minimum inhalation effort.

MSRP USD 699



OCEANIC OMEGA 3

Coupled with the FDX-i first stage, the Omega 3's levered servo valve makes inhalation effortless, while its inline ball swivel helps prevent jaw fatigue. What's more, a side exhaust design keeps your view unobstructed. Now that's something to keep photographers bubbling about. MSRP USD 700



All prices are intended as guide prices only and may vary according to dealer, country and exchange rates



MARES INSTINCT 12S

Smooth, effortless performance and a sleek, streamlined shape characterise the revolutionary Mares Instinct 12S. This lightweight regulator uses patented VAD and DFC technology, and the smart lateral side exhaust deflects bubbles away from the face making this a great choice for shooters. MSRP USD 590



MARES FUSION 52X

The new FUSION 52X from MARES represents a new benchmark in high-performance regs. The advanced Twin Power System allows a 77-percent increase in air flow for the highest breathing comfort. A new, high-performance first stage valve also delivers a 600-percent increase in durability, even in the most extreme conditions. MSRP USD 990



SCUBAPRO MK25 EVO

Scubapro's flagship first stage, the balanced piston MK25, has evolved for even better cold-water performance, and now features the patent-pending Extended Thermal Insulating System (XTIS). Available in the EVO first stages, the XTIS fully insulates the inner mechanical components for extra protection; techno polymers block metal-to-metal contact to prevent freezing. Pair the MK25 EVO with the S600, for premium-breathing performance in all conditions. MK 25 EVO: MSRP USD 423
S600: MSRP USD 462

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COMPUTERS

With a case diameter of just 48mm, the Newton is a truly compact dive computer. It's also the ideal tool out of the water as well. Packed with options and customisable settings, features include a backlit display, graphic CNS toxicity indicator, 70-hour logbook, and Mac/PC interface. The face is mineral glass and the watch has a heavy-duty reinforced case for resistance in the water down to 150 metres. MSRP USD 699



CRESSI NEWTON

DIVESYSTEM IDIVE

A highly technical but aesthetically beautiful computer for diving on air, nitrox, trimix and CCR, that you can also wear everywhere. Feature-rich with a rechargeable battery, compass, barometer, thermometer, lunar phase indicator (great for dive planning), installable apps, outdoor functions, and updatable software. It also boasts a Double-Core Algorithm (Buhlmann ZHL16-B + VPM-B) that you can choose from the dive menu. Stainless steel case and sapphire glass. MSRP USD 619



DIVESYSTEM IX3M

The world's first dive computer with an integrated, state-of-the-art GPS! All the features of the iDive and then some, this machine packs a punch with a high-contrast, fully customisable, 2.8" colour display, a Double-Core Algorithm, rechargeable battery, installable Apps, updatable software, barometer, luxmeter, altimeter, weather forecast, lunar calendar and more. Ready to handle any kind of diving. MSRP USD 990



MARES ICON HD BLACK EDITION

The legendary Icon HD has been redesigned for even greater readability and includes several new functions taking a great dive computer to a whole new level. With a host of new features like a new underwater menu, more 3D dive maps and greater logbook detailing, it will be love at first "HD colour" sight! MSRP USD 1,290



MARES SMART

This new gadget from Mares delivers on what it promises – a SMART computer. The new model is very well executed, boasting advanced features like multigas and apnoea capability without the huge price tag. With users reporting it among the easiest in the industry to use, the SMART certainly lives up to its name.

MSRP USD 450





SCUBAPRO MANTIS 1 (M1)

The new M1 dive computer performs beautifully everywhere. On the dive, the M1 excels with easily accessible tools, including an intuitive menu and four dive modes (including apnea and CCR), plus a swim mode. Other features include a user-replaceable battery. Topside, the M1 is equipped with full timekeeping functions and features for the gym or a hike. MSRP USD 638

SUUNTO EON STEEL

The intuitive Suunto EON Steel combines advanced technology with unrivalled clarity from its patented Suunto BrightSee colour screen. With customisable features and display, you can choose just what you need to see. A combination of display and glass technology minimises reflections while maximising the view angle. User-updatable software and with a hard-wearing, durable case, this sleek dive computer is definitely more than just good-looking. MSRP USD 1,727



SHEARWATER RESEARCH NERD

A solid investment for rebreather users, the NERD (Near Eye Remote Display) is a hands-free dive computer that sits on your rebreather mouthpiece. From here you can easily view all your important data on the display, which remains in your line of sight throughout the dive. MSRP USD 2,130

SEABEAR H3

A function-packed, watch-sized dive computer with a colour OLED screen with a multi-screen display, manufactured from the most hardwearing materials – stainless steel case and scratch resistant sapphire window. Handling air, nitrox and trimix, freediving as well as scuba, with a stopwatch, altimeter, compass, and USB port, this little bad boy is also rechargeable and Facebook ready. Yes, you read that correctly, you can now share your profiles straight to social media.

MSRP USD 1,050



CAMERAS



GOPRO HERO4 BLACK

The HERO4 Black is better, faster and stronger. Sharper image quality, an even more powerful processor with faster video frame rates, and a high-resolution video feature, the new GoPro lets you have greater control over colour, ISO limit, exposure and plenty more settings. We've always loved them. Now its verging on obsession. MSRP USD 500



GOPRO RED/MAGENTA DIVE FILTER

Another easy-to-use colour correction accessory. The red filter means an end to cyan hues in your images when you're shooting in blue water, or bring back vibrant footage from your green-water diving with the magenta filter. Simply snap them on to use – no messing, and no need for post-processing. MSRP USD 70

IKELITE FILTERS FOR FLUORESCENCE PHOTOGRAPHY

Looking for something different? A wide variety of corals and creatures emit a fluorescence you can't normally see. Add an excitation filter to your Ikelite DS161 strobe or Vega light, and a yellow filter to your mask and housing. Then start exploring and watch what glows!

MSRP USD 50 to 175



CANON EOS 7D MARK II

One of Canon's top-of-the-range cameras, the EOS 7D Mark II is designed for the most discerning of professionals and comes with some very impressive features, including a weather-sealed magnesium alloy body, a highly responsive autofocus system, and plenty of dials and buttons for even greater control of settings. MSRP USD 1,799



IKELITE TTL HOUSING FOR THE CANON EOS 7D MARK II

Providing full camera control and compatible with a wide variety of ports for the most popular lenses, the built-in TTL circuitry also facilitates the most accurate strobe exposure possible. This housing puts both exposure compensation and manual strobe control at your fingertips. MSRP USD 1,800



NAUTICAM NA-7DMKII HOUSING FOR CANON EOS 7DII MARK II

The NA-7DMKII is the most refined Nauticam SLR housing to date. The housing incorporates new enhancements to key exposure controls for both video and still photo users. Featuring Nauticam's most recent technological advances such as their revolutionary latches and their port locking lever, access to every camera function has also been made even easier through careful thought and design, guided by photographers in the field. MSRP USD 3,400



NAUTICAM SUPER MACRO CONVERTOR I

A breakthrough in underwater macro photography lenses with this internationally patent pending new optical design. Yielding simply amazing sharpness, contrast, and clarity that isn't available from a simple magnifying lens for use in air, sealed in a waterproof enclosure, the SMC takes a radically different approach: treat the system – camera, lens, port, air, and water – as a whole, and account for the air-water interfaces in a conversion lens designed to achieve the best image quality possible. MSRP USD 850



CANON POWERSHOT D30

No need for a housing when it comes to the PowerShot D30, this mighty little guy has a depth rating of up to 25 metres and is shockproof and freezeproof as well!

MSRP USD 330



SEALIFE MICRO HD

No more flooding and no more leaks? Sure, with the world's first permanently sealed underwater camera, that's definitely possible. This flood-proof camera is jam-packed with cool features, including 13 megapixel still images, 1080p HD video, and a built-in 140-degree fisheye lens. MSRP USD 399

PowerShot

Canon

Delighting You Always



PowerShot D30

25m

Waterproof

World's Deepest* Waterproof

Go down to as deep as 25m underwater to capture high quality images without an underwater casing.

* As of 20th January 2014. For compact type waterproof digital cameras.

-10°C

Freezeproof

Freeze No More

With strong resistance to cold temperature as low as -10°C, shoot at ease even in winter!

2.0m

Shockproof

Shockingly Strong

Equipped with 2.0m shock resistant capability, this camera is great for adventure junkies and is resistant to knocks and bumps.

**DiGiC
4**

**HS
SYSTEM**

**12.1 MEGA
PIXELS
HIGH-SENSITIVITY
CMOS**

**5x
OPTICAL
ZOOM**

GPS

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JAPAN**

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Canon Imaging Asia

YouTube

Canon Asia



NIKON D750

Successor to the D700, the Nikon D750 is able to shoot 6.5 frames per second and comes with a 91,000-pixel RGB metering sensor. You can also capture more-than-decent footage with this model's advanced video functions. MSRP USD 2,040



SEACAM SILVER FOR THE NIKON D750

Another gorgeous housing for one of Nikon's big rigs. Seacam brings their timeless style to bear on mechanical excellence with modern, ergonomic shapes and precision craftsmanship for the Nikon D750.

PRICE NOT YET RELEASED

NIKON D810

A beautiful evolution of the D800 with greater ISO range (64 to 12,800), superior focus, 36.3MP full-frame sensor, and a speed of five frames per second. You're going to need a serious memory card. MSRP USD 3,299



SEACAM SILVER FOR THE NIKON D810

Seacam is famous for their elegant, innovative, state-of-the-art housings for underwater image capture. The latest addition to its top-notch family is the Silver Nikon D810. Now you can make use of that impressive 36.3 megapixel image sensor to capture razor sharp details no matter how fast those marlin are moving! MSRP USD 5,526



OLYMPUS OM-D E-M10

The Olympus OM-D E-M10 is a micro four-thirds camera that really delivers when it comes to image quality. It also boasts a couple of nifty SLR-type functions and features (direct controls, viewfinder), perfect for anyone looking to get a little bit more serious with photography. MSRP USD 799



IKELITE TTL HOUSING FOR OLYMPUS OM-D E-M10

Whether you're moving up from a compact or scaling down from a DSLR, this carry-on sized system is a great choice. The only housing with true Olympus TTL exposure built in for perfect photos every time. An interchangeable port system allows the use of a variety of wide angle, macro, and zoom lenses.

MSRP USD 950 (includes port)





PANASONIC LUMIX GH4

From the range of cameras with some of the world's best lenses comes the micro four-thirds GH4, boasting an even quicker AF than the GH3, 4K video, 16.05 MP sensor, and a 2,359K-dot OLED live viewfinder.

MSRP USD 1,700

NAUTICAM NA-GH4 HOUSING FOR THE PANASONIC LUMIX GH4

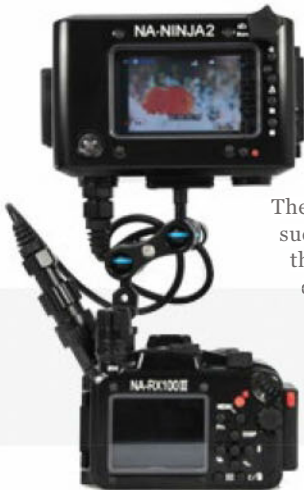
Nauticam's NA-GH4, a refined housing specifically for the LUMIX DMC-GH4, allows underwater photographers and videographers to achieve incredible 4K video and 16MP stills at an affordable price.

MSRP USD 2,250



SONY RX100 MKIII

The third addition to Sony's RX100 series is the Mark III. New and noteworthy upgrades include a pop-up electronic viewfinder, a shorter, brighter zoom with an optional neutral density filter, and a screen that can be angled in virtually any direction. MSRP USD 799



NAUTICAM NA-RX100III HOUSING FOR THE SONY DSC-RX100 III

The NA-RX100III sets a new standard for compact camera housings. While it builds on the success of the NA-RX100 and NA-RX100II, it is clear that Nauticam did not just copy and paste this housing into existence. The features you'd expect are certainly present, like ergonomic design, the clearly labelled controls, sculpted shutter release and more. A closer look reveals features like an updated fiber-optic connection block, built-in vacuum check system, two accessory bulkhead ports and support for routing HDMI cables for an external monitor.

MSRP USD 995

FANTASEA RX100 III

A fully loaded housing for the Sony RX100 III compact camera for full access to essential camera controls with marked buttons for easy operation. Depth-rated to 60 metres, extra watertight protection courtesy of double O-rings, and an added moisture detector at no extra cost. Don't forget that this housing means you've also got access to the full line of Fantasea accessories: wet lenses, colour correction filters and adaptors. MSRP USD 500



IKELITE STRAIGHT & 45 DEGREE MAGNIFIED VIEWFINDERS

Enjoy larger, brighter views of your DSLR or mirrorless camera's frame as compared to the housing's standard magnified viewfinder. Each attaches easily to your Ikelite housing with no modification required. The 45 Degree Viewfinder rotates for shooting portrait or landscape.

STRAIGHT: MSRP USD 850
45 DEGREE: MSRP USD 950

STROBES



FIRE DIVE GEAR BLUE STROBE FILTER

Make life easy on yourself when capturing the magical world of biofluorescence with this a set of fool-proof custom mounts that contain a sandwich of acrylic and dichroic blue filters. Slip the mount securely over your strobe and you are good to go. Compatible with strobes from Sea&Sea, Inon and Ikelite.

MSRP USD 175



INON Z240

A reliable, compact strobe with plenty of output. This 180-lumen, LED light has a guide number of 24 on high power, a 100-degree circular beam without a diffuser, and up to 110 degrees with. It recycles in just 1.6 seconds at full flash and boasts a next generation wireless TTL.

MSRP USD 510



LIGHT & MOTION SOLA DIVE 2000

The great thing about this dive light is the quick slide control that allows you to switch between spot and flood beam patterns. It's also compact and easy to control. Features 2,000 lumens in a 60-degree flood beam with a 600-lumen, 12-degree spot beam.

MSRP USD 799



SEA & SEA YS-D1

From subtle light output as low as guide number one to a maximum power of guide number 32, control of underwater lighting is effortless with the little YS-D1. Versatile and responsive, the YS-D1 is great for macro as well as wide-angle photography.

MSRP USD 560



MARES CRUISE BACKPACK

The Cruise Backpack has been restyled for compact and lightweight travel. Offering great stability and manoeuvrability, the improved design incorporates new materials with large sturdy wheels, adjustable external compression straps, handy front pocket and a telescopic handle.

MSRP USD 300



MARES CRUISE BACKPACK DRY

This lightweight wonder is brimming with innovative functions that make dive travel breezy! Weighing in at just 1.5kg, this bag has a 108L capacity and uses heat sealing for a watertight finish. With removable padded shoulder straps, waterproof zip and ultra-light buckles, you can't go wrong! MSRP USD 140



BEUCHAT APNEA BACKPACK

Ideal for freedivers and those freakishly long fins. Cram it all in, sling it over your shoulder, and off you go. MSRP USD 65



All prices are intended as guide prices only and may vary according to dealer, country and exchange rates

VIDEO LIGHTS

IKELITE DS161

One of the best strobes on the market, the DS161 features a built-in 500-lumen video light that can also be used as a focus assist light. When combined with a compatible Ikelite TTL system or film TTL system, the DS161 automatically adjusts brightness to provide perfect exposure whether you're shooting macro, portrait or wide angle.

MSRP USD 1,100



KELDAN VIDEO 4X

The Keldan Video 4X light is extremely small and lightweight, yet provides a stunning 6000-lumen true measured output with a colour rendering of 82 CRI. Battery packs can be changed easily in the field, supporting a long day of shooting. The usable beam angle in water is 110° with a soft fall off.

MSRP USD 1,540



FANTASEA RADIANT 1600

This powerful 1,600-lumen video light features a wide beam angle of 110 degrees, making it a suitable light for a variety of compositions. There's also a three-level adjustable power output, which allows you to control the intensity of the beam and with this you can extend your burn time.

MSRP USD 1,540



ORCA TORCH D500V VIDEO LIGHT

A portable diving light with 120 degrees super wide floodlight with no blind angle for underwater photography. Equipped with a totally sealed magnetic side switch for flexible operation of the three brightness levels and strobe mode. High-tech LEDs provide a maximum of 700 lumens output and over 18 hours runtime. Simple, robust and depth rated to 150 metres. MSRP USD 117

TORCHES

FIRE DIVE GEAR BLUE ULTRA

Are you in on fluoro night diving and photography? If you're into the idea of blue lights and getting a glimpse of the world of biofluorescence, (that's glowing, UV marine life to the uninitiated), the Blue Ultra will come in handy, but don't forget your yellow filters – you can also pick them up at Fire Dive Gear.

MSRP USD 189



MARES EOS FAMILY

Light up your life with Mares EOS torches. These high-powered and reliable torches range from small and compact to large and powerful. Using high-intensity LEDs and materials like anodised aluminium and anti-shock rubber, you can night dive with confidence knowing your EOS will light the way. MSRP FROM USD 90



SCUBAPRO NOVA 700

The new Nova 700 torch excels at its price, with safety features and 700 lumens – levels of illumination typically found in more expensive models. The rugged aluminium body is waterproof to over 300 metres.

MSRP USD 179



DIVE RITE LX20

Dive Rite is cutting the cable with the new LX 20 handheld primary light. This small package provides a powerful 20,000 lux and a four-hour burn time on high power from its rechargeable batteries (included). A rotary magnetic switch allows for an easy on/off function, as well as switching between the three power modes. Depth rated to 152 metres. MSRP USD 750

KNIVES



Versatile and durable with a blade crafted from a single piece of 4mm, rust resistant titanium. The butt of the handle comes to a point for hammering, breaking and crushing. Comes with two rubber leg straps.

EZYCUT TRILOBITE

At the literal cutting-edge of emergency cutting tool dynamics and design, the Eezycut Trilobite was developed for divers, mariners, mountaineers, extreme sports adventurers and rescue service providers who demand a tool that delivers a swift, safe, efficient cut. MSRP USD 25

AQUALUNG ARGONAUT

MSRP USD 199



GADGETS



NAUTILUS LIFELINE

Dive with peace of mind with the Nautilus LifeLine. This VHF marine rescue radio comes fitted with a GPS so you can call or send a distress signal to boats in the vicinity, whether you're in or out of the water, under any conditions. The Nautilus Lifeline can accompany you on dives to as deep as 130 metres. A must-have piece of kit for every serious diver. MSRP USD 299

GUL NEOPRENE GLOVE TORCH HOLDER

Does your torch sometimes get in the way of your dives? Whether you're working a camera or just want peace of mind (read: not worrying about losing your very expensive torch), this glove could be the answer. It's mainly designed to accommodate i-Torch products (10–15mm in diameter) but could be compatible with other models. MSRP USD 15

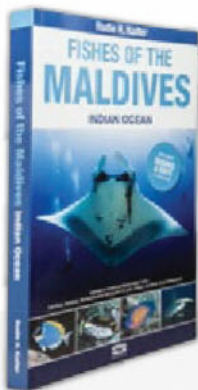


GLO-TOOB AAA SERIES

We are still crazy about this sturdy little light. Good to 60 metres, with a battery life of up to 15 hours, and it comes in five colours. Take it with you on a night dive, or keep it in your BCD pocket as a safety light; it has three useful modes including strobe. A simple, quality product that could make all the difference. MSRP USD 22



BOOKS

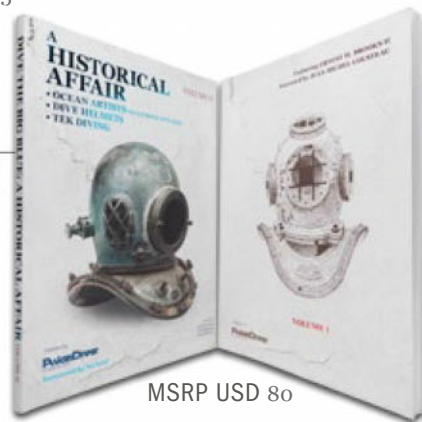


FISHES OF THE MALDIVES INDIAN OCEAN RUDIE H. KUITER

A must-have reference book for any diver in the Maldives and beyond, this comprehensive guide is illustrated with clear photos, and contains scientific, conservation, and anatomical information. Now in its second edition, it has been revised and updated and now includes a shark and ray section by Tim Godfrey. www.uw3some.com/shop MSRP USD 35

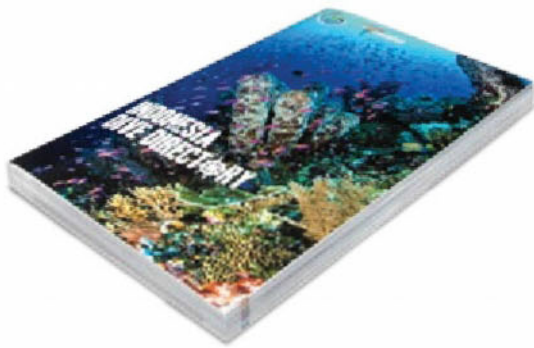
DIVE THE BIG BLUE: A HISTORICAL AFFAIR VOL I & II ASIAN DIVER

A riveting compendium charting the history of scuba diving, packed with fascinating information on the people and equipment that drove this sport into modern times. Showcasing beautiful work by eminent photographers and artists such as Ernie H. Brooks II and Wyland, these are gorgeous reference books for anyone interested in the magnificent world beneath the sea. www.uw3some.com/shop



MSRP USD 80

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INDONESIA DIVE DIRECTORY

INDONESIA TOURISM BOARD

If you're planning on doing any diving in Indonesia, as a tourist or professional, this book needs to come with you. Listing every noteworthy dive site in the archipelago with Indonesia's new Dive Site Classification System, comprehensive information on what you can see, and what you need to watch out for, site maps, species information and much more, this book still manages to be small enough to slip unobtrusively into any dive bag. www.uw3some.com/shop MSRP USD 55

BITS & PIECES



SEAMADE

Support a zero waste and sustainable alternative livelihood initiative. Each one-of-a-kind purse is handcrafted from disposable plastic bags and canvas rice sacks removed from the beaches and dive sites around Gili Trawangan.

FLAT PURSE: MSRP USD 20
MEDIUM PURSE: MSRP USD 25
LARGE SQUARE PURSE: MSRP USD 30



TANK RUM

Tank Rum is a new premium white rum designed for scuba divers and ocean adventurers. Drink Tank has launched a crowd-funding campaign for Tank Rum's launch, and there are great rewards for scuba divers and rum lovers! Support the campaign and help bring Tank Rum to the world!
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Lighten up the colorful world underwater



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- Cree XM-L2(U2) LED, max 700 lumens output
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High intensity waterproof light source

RESELLERS WANTED



- Waterproof to 60 meters (200 feet)
- 3 Modes to choose from
- 360° Viewing angle
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- 4-15 hours of battery life (dependent on mode selection)

COLORS AVAILABLE

GT-AAA White	
GT-AAA Blue	
GT-AAA Green	
GT-AAA Amber	
GT-AAA Red	



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**1. THE CORAL
TRIANGLE**

**2. MUCK DIVING
MECCA IN LEMBEH**

**3. MOLA MOLA
IN BALI**

**4. RAJA AMPAT'S
RECORD-BREAKING
DIVERSITY**

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FIRST SHARK
AND MANTA
SANCTUARIES**

20 REASONS

Why Asia-Pacific has the Best Diving in the World

Bold statement, but we're sure of it. From unique lakes full of stingless jellyfish to shark sanctuaries – Asia-Pacific has got it all. In no particular order, here are just 20 of the hundreds of reasons why diving in this neck of the woods is so awesome.

We're also 100-percent sure that after reading this you'll want to go and book a dive holiday immediately, so we have made it as easy as possible. Here is the 2015 Destinations Directory. Take your pick!

Liveaboard



Dive centre



Resort



Max. number of
divers per guide

3

Certifying
agencies



Languages



**11. SIPADAN'S BIG
FISH ACTION**

**12. POSSIBLY THE
WORLD'S BEST
SHARK DIVE IN FIJI**

**13. THE GREAT
BARRIER REEF - THE
WORLD'S LARGEST**

**14. POOR KNIGHTS'
UNIQUE MELTING
POT OF SPECIES**

**15. ENDEMICS
EVERYWHERE**

**6. JELLYFISH LAKES
IN INDONESIA
AND PALAU**

**7. MORE MAGICAL
LAKE DIVING IN THE
PHILIPPINES**

**8. TUBBATAHA
WORLD
HERITAGE SITE**

**9. THRESHER
SHARKS AT
MONAD SHOAL**

**10. WHALE SHARKS
GALORE AT OSLOB,
CENDRAWASIH BAY,
RICHELEU ROCK
AND NINGALOO**

1 THE CORAL TRIANGLE IS RIGHT HERE

The Coral Triangle – an area that covers the waters of Indonesia, Malaysia, the Philippines, Papua New Guinea, Timor Leste and Solomon Islands – is home to nearly 600 species of coral, over 2,000 types of reef fish, and six of seven turtle species. In other words, it is THE hot-spot for marine biodiversity.

Image © Shawn Heinrichs



ALOR DIVERS
INDONESIA
EAST NUSA TENGGARA
ALOR ISLAND

A small and professional eco dive resort situated on a 400m white, sandy beach. A cozy getaway with personalised attention and an unforgettable diving experience: Custom-built speed boats, Western management, experienced dive guides, dive sites just five to 30 minutes away, only one group per dive site and unlimited diving on a superb house reef! The reefs are rich with corals and colours, abundant fish life, incredible pelagic surprises and great muck diving.

3 PADI



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DIVE INTO AMBON
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MALUKU
AMBON

Ambon's newest dive centre and the only operator diving both the amazing muck sites and the beautiful southern coral sites on a daily basis, for caves, swim-throughs, bubbling sand, pristine reefs, wrecks and muck. First class, full service diving, catering for photographers and videographers.

4 PADI

Highest Course offered
PADI Divemaster



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INDONESIA
RAJA AMPAT
KOMODO, ALOR,
BANDA SEA

Pioneering diving in Raja Ampat and the Banda Sea, since 1992, the *Pt. Pindito* quite possibly boasts the region's most knowledgeable crew. After exploring Raja's world-famous biodiversity, relax aboard this top quality vessel, indulging in a classical Balinese massage or an aromatherapy session.

5

Highest Course offered
Nitrox



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LIQUID ADVENTURES
INDONESIA
BIRA AND WAKATOBI

Archipelago adventures in the Coral Triangle on a 22m wooden *Pinisi* schooner for up to eight guests for boutique diving and dining. Attention to detail, with safety paramount and a boat crewed by the famed Bugis seamen of South Sulawesi. Private charters, bespoke trips, or join a group.

4 SSI

Highest Course offered
SSI Advanced Adventurer



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DIVING RESORT
INDONESIA
NORTH SULAWESI
BUNAKEN ISLAND

A small and comfy dive resort in the heart of Bunaken National Marine Park, famous for its breath-taking walls, healthy corals and marine life. This is a PADI five-star dive resort with professional European dive instructors, excellent local dive guides, and 10 traditional wooden bungalows with beautiful sea views.

4 PADI

Highest Course offered
PADI Divemaster



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THE GREAT WALL
OF CHINA**

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OCEAN GIANTS**

**20. THE ICONIC
MALDIVES**



Image © Richard Smith

WAKATOBI DIVE RESORT

INDONESIA

Wakatobi is right in the heart of an area with the highest coral reef biodiversity in the world. This means that the pristine reefs here offer an astounding array of marine creatures – everything from the tiny bobtail squid to majestic green turtles.

Wakatobi is also ensuring that the reefs around the resort are protected, having developed and now managing the Collaborative Reef Conservation Program in consultation with local leaders and village elders. The program provides an economic alternative to fishing and creates real incentives that help protect and manage the reefs.

With 43 dive sites in close proximity to the resort, and professional dive staff of qualified instructors with an average of 3,000 dives each, a once-in-a-lifetime experience is guaranteed. You can even choose to have your own personal guide for the duration of your stay. For advanced divers, instructor-level guides have cave diving and rebreather specialties. And naturally, all the guides know the reefs intimately, so if there's a critter you've always wanted to see or photograph, they will know where to find it.

Wakatobi Dive Resort also operates the *Pelagian*, an outstanding boutique-style motor yacht, which takes you to the outer reaches of Wakatobi, through the islands of Tomia, Kaledupa, Wangi Wangi and Buton. Both reef diving and muck diving is offered aboard the *Pelagian*, allowing you to experience everything that the exotic underwater world of magical Wakatobi has to offer.



Highest Course offered: Advanced nitrox.
Ask about courses that can be arranged on request.

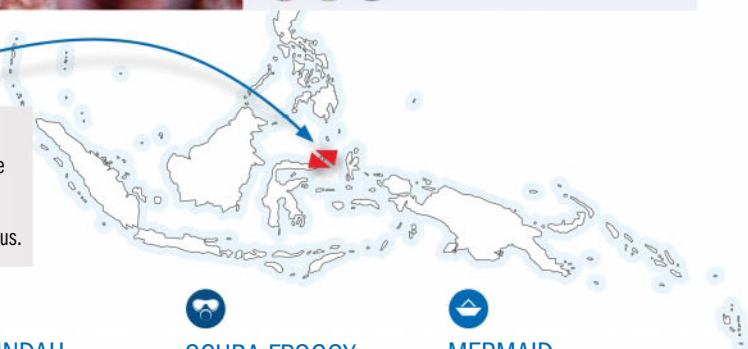
www.wakatobi.com | office@wakatobi.com



2

WORLD-CLASS MUCK DIVING IN LEMBEH

When it comes to muck diving, Lembah's hard to beat. Black volcanic sand makes up most of the seabed, and the grain's so fine that one kick might cause the visibility to drop immediately (that being said, your buoyancy had better be good should you choose to explore Lembah). Look out for the many weird and wonderful macro critters here, including the hairy frogfish and the mimic octopus.



HAMUECO RAJA AMPAT

INDONESIA

WEST PAPUA RAJA AMPAT, WEIGO ISLAND

A dive operator with budget accommodation for your stay in Raja Ampat. With six rooms over the water facing Raja Ampat's beautiful sunsets, this is a great low-key way to explore one of the world's best dive destinations.

4 PADI



www.hamueco.com
info.hamueco@gmail.com



WAI ECO RESORT—SCUBACQUEANDO DIVING RAJA AMPAT

INDONESIA

WEST PAPUA RAJA AMPAT, WEIGO ISLAND

Stay in one of three cottages nestled in a fantastic equatorial garden overlooking the sea. The spectacular house reef, lagoon, and numerous thriving dive sites make this an unforgettable destination for divers and snorkellers.

4 PADI



www.waicoresort.com
scubaqueando@libero.it
waicoresort@libero.it



MIMPI INDAH RESORT

INDONESIA

NORTH SULAWESI BANGKA ISLAND

A boutique style eco dive resort on Bangka Island, a serene tropical paradise just off the northern coast of Sulawesi, offering some of the best experiences to be had in the natural world, from stunning diving to jungle exploration.

4 PADI



Highest Course offered
PADI Divemaster
www.mimpiindah.com
info@mimpiindah.com



SCUBA FROGGY INDONESIA

INDONESIA

LOMBOK SENGIGI, KUTA

Operating in Lombok from the Gili Islands to Belongas, and working with high-end hotel partners at the Novotel in Kuta, Sheraton, Kila Senggigi Beach Hotel and Pool Villas Club in Senggigi. Get away from the crowds and expect the best standards in customer service and small dive groups.

5 PADI



Highest Course offered
PADI Divemaster
www.scubafroggy.com
contact@scubafroggy.com



MERMAID LIVEBOARDS

INDONESIA

KOMODO, RAJA AMPAT, ALOR, AMBON

Affordable luxury liveboards attracting regular repeat guests, these crews pride themselves on their professionalism and will ensure you have a great time exploring Komodo National Park, Raja Ampat in West Papua, Lembah (the critter heaven) in North Sulawesi, or while diving with hammerheads in Banda Sea, Ambon.

4 PADI



www.mermaid-liveboards.com
info@mermaid-liveboards.com



MIGUEL'S DIVING

INDONESIA, SULAWESI, GORONTALO

Dive with Gorontalo's pioneer operator on the pristine reefs of Tomini Bay, Sulawesi. Custom-built speedboats take guests to over 30 dive sites. Make the most of the incredible opportunities for both wide-angle and macro photography with trained dive guides. Divers choose from coral walls, multiple pinnacles, caverns, muck, submerged points and historical wrecks. Gorontalo is home to the famous Salvador Dali sponges - outlandish, sculptural lifeforms that are found nowhere else on earth.

Daily flights are available, including connecting flights with Silk Air Manado. The best diving season is from November to April.

www.miguelsdiving.com | info@miguelsdiving.com



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Photos by William Tan

miguelsdiving.com

info@miguelsdiving.com



Miguel's Diving Gorontalo

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WAKATOBI DIVE RESORT:

The Divers' Favourite

"I have been diving for over 15 years and have been to dive resorts all over the world. I am often asked to name my favorite resort or liveaboard. It's often a hard question to answer since I've been to so many. Now the question has an easy answer – Wakatobi and the Pelagian, nothing else comes close!"

- Don Anderson

From the moment you step off the plane in Bali, Wakatobi's staff take pride in attending to your every need. This is five-star service with a warm, welcoming touch. Every worry is removed from your stay at the resort, and from every dive, with guides dedicated to maximising your underwater experiences.

Wakatobi's underwater environment is one of the richest and most bio-diverse on the planet. All-day access to sites provides divers with many hours of creature-packed enjoyment. Knowledgeable guides are experts at pointing out small, rare subjects. Warm, clear water and a plentitude of intriguing subjects; it's a dream formula. From dedicated storage space and expert camera assistance to the keen-eyed guides, image-makers want for nothing.

Wakatobi's sites are also ideal for staging long, productive dives. Support includes a range of tanks, and specialty gasses provided by an experienced staff able to accommodate the needs of closed circuit diving, including dedicated boats for rebreather groups.

Guests can discover an even wider range of underwater experiences aboard the luxury dive yacht Pelagian. From sea mounds to renowned muck diving sites, Pelagian takes in the best of Southern Sulawesi, accommodating a maximum of ten guests in luxurious style.

But you don't need scuba gear here – the expansive House Reef is a snorkeller's paradise, as are most of the dive sites; ideal for families and groups that include both divers and non-divers. First timers can enjoy lessons and private guide services, and veteran snorkellers have a wide range of experiences to choose from.

Wakatobi is one of the world's finest dive resorts, but there are also plenty of opportunities for relaxation above the water - from beach time to nature tours, spa services, and visits to neighbouring villages, all set against one of nature's most spectacular, pristine backdrops.

The only drawback with Wakatobi is that once you've been here, you might never again find another place that even comes close.

"Of all of the destinations I have visited around the world, Wakatobi remains the one where I am excited on every dive by the incredible underwater perspectives"

Warren Bavenstock

The reefs around Wakatobi are bursting with life and colour, evidence of a well-managed conservation initiative established by the resort
Image © Walt Stearns





The perfect combination

Pairing a stay at Wakatobi dive resort with a cruise on the Pelagian provides the ultimate dive vacation experience.

Resort or Liveaboard? You can enjoy the best of both at Wakatobi. Begin with a stay at the resort, known as one of the world's best diving destinations. Here, you'll have daily access to more than 40 dive and snorkel sites, as well as unlimited opportunities to explore Wakatobi's renowned House Reef. Enjoy fine dining and the comforts of beachside villas and bungalows. Discover what five-star service means as the resort staff anticipates and meets your every need.

Next, expand your diving horizons on Pelagian, Wakatobi's luxury dive yacht. This luxuriously appointed 36-meter vessel carries a maximum of ten guests while venturing farther afield in the Wakatobi archipelago and the southern shore of Buton Island. A dedicated chef provides fine dining, and a one-to-one staff-to-guest ratio ensures the utmost in attentive personal service.

Discover the possibilities of a combination resort and liveaboard experience. Contact a Wakatobi representative at office@wakatobi.com.

"We spent the first week on Pelagian and the 2nd week on the island. The Pelagian was spacious and comfortable, like being in a 5 star hotel! Wakatobi resort was just as amazing - staff, accommodation, food, diving – all out of this world. Dive instructors ensured your experience was personal and you got the best out of your trip."

Nicola Willis, August 2014



www.wakatobi.com



ARENUI BOUTIQUE LIVEABOARD INDONESIA **RAJA AMPAT KOMODO, ALOR, MALUKU**

Dive the world's number one spot for biodiversity from a boat with spacious cabins, furnished with exquisite handicrafts, a fabulous sky deck, and tasty buffets plus daily a-la-carte menus. Twenty two crew (incl. two western cruise directors and three local dive guides) serve a maximum of 16 guests, for a truly first-class experience!

4 PADI

Highest Course offered
PADI Divemaster

www.thearenui.com
info@thearenui.com



ANUGERAH SURF & DIVE RESORT INDONESIA **ROTE ISLAND MEMBERALA**

A locally-owned business with a 30-room resort from which you can take dive trips around the southwest coast of the beautiful Rote island. Guests also have access to the epic surf break, T-land.

4 PADI

Highest Course offered
PADI Divemaster

www.surfdiverote.com
info@surfdiverote.com



ORCA DIVE CLUB INDONESIA INDONESIA **BALI** CANDIDASA AND LOVINA **KOMODO, LABUAN BAJO FLORES**

Part of the worldwide group Orca Dive Clubs, with three centres in Indonesia, these German-managed operations are located near the most famous dive sites in Bali, and at Flores inside the Komodo National park.

4 PADI SST

Highest Course offered
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www.orca-dive-club-bali.com
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info@orca-diveclub-lovina.com
info@orca-diveclub-flores.com



TASIK RIA INDONESIA **NORTH SULAWESI MANADO**

This boutique style, family-run resort is a place of luxury and comfort, with rejuvenating spa treatments and candlelight dinners by the beach. Diving in Manado is world-class, with impressive diversity — you might even chance upon dugongs in the seagrass beds! Tasik Ria also caters for divers with disabilities and has a dedicated camera room and nitrox.

4 PADI TDI

Highest Course offered
PADI Divemaster

www.tasikdivers.com
info@tasikria.com



ABSOLUTE SCUBA BALI INDONESIA **BALI** PADANG BAI

Located in the centre of Bali's best diving and a heaven for photographers, Absolute offer tailor-made trips for all divers. Within 20 minutes of the dive centre you've got everything from the from the mighty Mola mola to possibly the best muck diving in the world, with mantas, sharks, turtles, and wrecks all year round.

4 PADI

Highest Course offered
PADI Instructor

www.absolutescubabali.com
info@absolutescubabali.com



DIVE TODAY INDONESIA **BALI** SANUR

An impressive range of services, with accommodation, a dive centre and liveaboards available for you to tailor your perfect dive experience at sites from the Komodo Islands to Sulawesi if you opt for the liveaboard. The immense variety of corals and underwater creatures in Indonesia will certainly leave you amazed.

6 PADI

Highest Course offered
PADI Instructor

www.divetodayscuba.com
info@divetodayscuba.com



ORA DIVE INDONESIA **FLORES LABUAN BAJO**

Experience the best dive sites in the famous Komodo National Park by speed boat. A perfect choice if you don't have time for a liveaboard but still want to dive one of the best dive locations in the world.

3 PADI

Highest Course offered
PADI Divemaster

www.oradive.com
info@oradive.com



NOMAD DIVERS BANGKA INDONESIA **NORTH SULAWESI BANGKA ISLAND**

A small, friendly UK-run dive resort with five cottages, a beachfront restaurant and bar and fantastic diving. Focused on safe diving, comfortable accommodation, good food and good company!

2 PADI

Highest Course offered
PADI Divemaster

www.nomaddiversbangka.com
info@nomaddiversbangka.com



BALI AQUA INDONESIA **BALI** SANUR

Specialising in private boat charters for small groups to Bali's best sites; visit the USS *Liberty*, or go macro hunting for nudibranchs, ghost pipefish, frogfish and seahorses at Padang Bai, to Menjangan island for Bali's best wall diving and to Nusa Penida for occasional manta rays and seasonal Mola molas.

3 PADI

Highest Course offered
PADI Divemaster

www.baliaqua.com
info@baliaqua.com



7SEAS

INDONESIA, LOMBOK, GILI AIR

Set on the stunning tropical island of Gili Air, just off northwest Lombok and a boat's ride from Bali, 7SEAS is located right on the water front, surrounded by the Gili's crystal blue waters and sandy white beaches.

As a full-service PADI 5 Star Instructor Development Dive Resort, CMAS and Tec Rec centre, 7SEAS offers recreational or technical diving day trips and courses for all levels in one of the world's best scuba diving destinations. Certified dive professionals will guide you through the underwater world of the archipelago where a large diversity of fish and corals await you.

7SEAS also offers cottages, backpacker rooms and a private two-bedroom luxury villa making the resort an accommodating and welcoming place for guests from all walks of life. True to the authentic environment of the island, the modernised recycled joglols give 7SEAS its unique Lombok style look. Set within a lush tropical garden, this is the ultimate, idyllic holiday paradise.



Highest Course offered: Instructor

www.7seas-international.com | contact@7seas.asia



3 MOLA MOLAS IN BALI



These odd-looking, gigantic flat and silvery beasts are the heaviest of all the bony fish. They can measure up to four metres vertically, and three metres horizontally, and weigh up to two tons. You can try to spot them in Nusa Penida, Bali, from July through October.

Image © Roger Munns



MANTA DIVE GILI AIR INDONESIA LOMBOK GILI AIR

Diving to satisfy all levels and dive education from beginner to Instructor. Small groups and the highest standards. Rooms are beautiful, traditional Lombok style bungalows kitted out with all modern comforts.



Highest Course offered
SSI Instructor



www.manta-dive-gili-air.com
info@manta-dive-gili-air.com



DIVE KUPANG DIVE INDONESIA NUSA TENGGARA TIMUR KUPANG

Day diving and fully escorted dive packages by the original founder of Kupang diving, Donovan Whitford. An Australian PADI MSDT with thousands of dives in Kupang. The reef diving is great and they also offer freshwater cave diving as a unique option. Prior booking is essential!



Highest Course offered
PADI Assistant Instructor



www.divekupangdive.com
info@divekupangdive.com

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DAMAI I AND II
INDONESIA
KOMODO, ALOR/FLORES,
BANDA SEA, FORGOTTEN
ISLANDS, RAJA AMPAT, TRITON
BAY, CENDRAWASIH BAY

Cruise the vast Indonesian archipelago on the Damai fleet, dive in remote areas and revel in reefs of abundant diversity. Equipped with the latest navigation, communication and safety equipment, the Damai fleet sets a new standard for safety, comfort, and service.

4



www.dive-damai.com
info@dive-damai.com



ALL 4 DIVING
INDONESIA
INDONESIA
BALI DENPASAR,
SANUR BEACH

Building on 16 years of success in the dive industry, All4divingIndonesia in Bali is a PADI 5-Star dive centre, providing a full range of PADI courses. Offering many options for day diving and snorkelling trips in Bali, or liveaboard trips all around Indonesia to places such as Komodo and Raja Ampat.

4



Highest Course offered
PADI Divemaster



www.all4divingindonesia.com
info@all4divingindonesia.com



BALI SCUBA
INDONESIA
BALI DENPASAR,
SANUR BEACH

The colourful waters of Bali are bursting with marine life from nudibranchs to the majestic Mola mola. With dive courses from introductory level up to Divemaster, this 5-Star Instructor Development Centre definitely has something for everybody.

4



Highest Course offered
PADI Instructor



www.baliscuba.com
letsdive@baliscuba.com



INDO SIREN
INDONESIA
KOMODO, RAJA AMPAT
AND Banda Sea

Launching in 2016 by Master Liveaboards, for year-round diving around the Tuaomotu Archipelago. Offering a full range of 7-10 night cruising for 20 guests in 10 well-appointed, spacious, en suite cabins. Set up for shooters with a charging station and plenty of storage.

6



Highest Course offered
Advanced, Nitrox



www.sirenfleet.com
info@sirenfleet.com



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LOMBOK GILI AIR

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4



Highest Course offered
PADI Divemaster



www.bluemarinedive.com
info@bluemarinedive.com



KOMODO DANCER (DANCER FLEET)

INDONESIA, KOMODO

The 98ft *Komodo Dancer* is a homely and modern liveaboard, with every amenity and modern comfort. This magnificent liveaboard brings guests to the Komodo National Park, which was established in 1980 and was declared a World Heritage Site and a Man and Biosphere Reserve by UNESCO in 1986.

The Komodo National Park encompasses 1,817 square kilometres of spectacular land and marine wilderness, including the islands of Komodo, Rinca, Padar, and Gili Montagne and their surrounding waters. These waters channel impressive currents that bring rich nourishment to the area, which, in turn, attracts pelagics like mantas and sharks.

The *Komodo Dancer* offers seven-, 10- and 11- night cruises, featuring an enhanced itinerary that allows guests more time diving, and more time in the signature area of the Komodo National Park. The various itineraries take guests to view the splendour of the Komodo National Park, Alor Archipelago, Bali, Tulamben and East Sumbawa, for an unforgettable trip.



Highest Course offered: Advanced Open Water,
www.dancerfleet.com
info@liveaboardfleet.com

5



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Countless marine biologists who've carried out surveys in the vast, liveaboard-friendly waters of Raja Ampat have said that the biodiversity found in the area is one of the highest recorded on Earth. That's a lot of species!



BAMBU DIVERS INDONESIA **BALI** CANDIDASA

In the midst of top dive sites in the pristine waters of Indonesia, this is the perfect gateway to the world of stunning reefs and wrecks. Safety is priority here, with only brand new and well-serviced equipment used.

4 PADI

Highest Course offered
PADI Divemaster



www.bambudivers.com
info@bambudivers.com



DIVEZONE LOMBOK INDONESIA **SOUTH LOMBOK** BELONGAS BAY, DESERT POINT, PEARL BEACH

South Lombok offers spectacular diving. In Sekotong, plentiful macro life at thriving reefs home corals, crinoids and rare marine life. Belongas Bay diving ranges from exciting to challenging with seasonal sightings of pelagics mobula and eagle rays in September, hammerheads schooling from the end of June to the end of October.

6 PADI

Highest Course offered
PADI Instructor



www.divezone-lombok.com
office@divezone-lombok.com



REEF SEEN DIVERS RESORT INDONESIA **BALI** PEMUTERAN, GEROKGAK

This PADI 5-Star resort was the first dive operation in the area. Access to 40+ sites in Pemuteran Bay and Menjangan Island with eight rooms on-site. Heavily involved in local environmental conservation projects.

6 PADI

Highest Course offered
PADI Advanced
Open Water



www.reefseenbali.com
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4 PADI SSI

Highest Course offered
SSI Instructor



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info@bidp-balidiving.com



DIVE ALOR DIVE INDONESIA **EAST NUSA TENGGARA** ALOR ISLAND

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14 PADI

Highest Course offered
PADI Assistant Instructor



www.divealordive.com
divetrips@info@divealordive.com



VILLA MARKISA - BEACH BUNGALOWS AND DIVE RESORT INDONESIA **BALI** BATU DAWA KELOD, TULAMBEN

At the foot of Gunung Agung, private bungalows, individual service and attention to detail. Dive Tulamben's USS *Liberty* wreck, just minutes away. For critters, Seraya Secrets is directly off the beach.

4 SSI

Highest Course offered
Dive Control Specialist



www.villa-markisa.com
info@villa-markisa.com



MS/V WAOW INDONESIA RAJA AMPAT, KOMODO, BANDA SEA, FORGOTTEN ISLANDS, ALOR, HALMAHERA, SULAWESI, CENDRAWASIH BAY

This beautiful, new five-star schooner holds nine staterooms with Internet connection, a full service bar and exceptional dive facilities, visiting sites of incredible biodiversity, from sharks and rays to turtles and even the giant ocean sunfish.

4 PADI

Highest Course offered
PADI Instructor



www.waowcharters.com
info@waowcharters.com



PT SEA ROVERS INDONESIA **BALI** SINGARAJA, PEMUTERAN

Personal service with safety taken care of. Dives around Pemuteran (home to the conservation projects, Biorock, the Underwater Temple Garden and the new Garden of the Gods), Menjangan Island, and Secret Bay.

6 PADI SSI

Highest Course offered
PADI Divemaster



www.searovers.net
dive@searovers.net



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with Gradient Factors

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USB Rechargeable Battery
Mass Storage / Pen Drive Mode



PALAU AGGRESSOR II (AGGRESSOR FLEET)

PALAU, KOROR

Palau's mushroom-shaped, rocky islands offer a variety of exciting dives: WWII wrecks, shark-infested channels, blue holes, a freshwater lake with stingless jellyfish and even a few caves. There are also sheer walls covered in lush soft corals and huge anemones.

Palau is a year round destination with something for every season. While German Channel has many resident manta rays, during the mating season, December through March, Dancer guests may see as many as 20 - 30! February and March offers large schools of moorish idols, unicorn fish and several species of butterflyfish. All year round, the *Palau Aggressor* crew encounters massive bait balls of scad in and around Ulong and German Channel and on the reefs of Blue Corner and Sias Corner.



Highest Course offered: Advanced Open Water, SSI

www.aggressor.com

info@liveaboardfleet.com



5 THE WORLD'S FIRST SANCTUARIES FOR SHARKS AND MANTA RAYS



Two places in Asia-Pacific have made conservation history. Palau banned commercial fishing of sharks in its waters in 2009 and it is now quite possibly one of the best places in the world to dive with these charismatic creatures. Indonesia made an equally historical declaration in 2014, prohibiting the fishing of manta rays in its territory. Hopefully it won't be long before we start see manta numbers on the increase.

Image © Aaron Wong



PALAU SIREN PALAU

Dive the famous Blue Corner, German Channel, Ulong, Peleliu, WWII wrecks and snorkel in Jellyfish Lake. Take a seven or 10 night trip on this beautiful, roomy boat set up for photographers, with a friendly, professional crew.



Highest Course offered
PADI Divemaster



www.sirenfleet.com
info@sirenfleet.com



PHILIPPINE SIREN PHILIPPINES VISAYAS AND TUBBATAHA

For the Coron wrecks, the macro wonderland of Anilao and Batangas, the Visayas and Tubbataha National Park, take a six, seven or 10 night safari on the gorgeous boat with eight ensuite cabins, camera station and a great crew.



Highest Course offered
Advanced Open Water, Nitrox



www.sirenfleet.com
info@sirenfleet.com



TURTLE BAY DIVE RESORT PHILIPPINES **CEBU** TONGO, MOALBOAL

A laid-back boutique resort with magnificent views of Cebu's mountain range and Turtle Bay. Beautiful coral walls and abundant reef fish await divers who venture into the depths of this little gem of a dive destination.



www.turtlebaydiveresort.com
chris@turtlebaydiveresort.com



6

SWIM WITH MILLIONS OF JELLYFISH **IN INDONESIA AND PALAU**

No, you won't get stung. Locked in a lake, these stingless jellyfish have lost their ability to sting because where they live, they don't have any predators. These lakes are microcosms of evolution. One is found in Kakaban in Derawan, Indonesia, and the other in Palau.



7

LAKE DIVING IN THE PHILIPPINES



CEBU FUN DIVERS PHILIPPINES

CEBU PANAGSAMA
BEACH, MOALBOAL

Diving in Moalboal promises warm tropical water, colorful life, deep walls and a vibrant ecosystem. Shore diving is excellent, with a coral reef with a steep wall just in front of the dive shop. Other dive sites are only a few minutes away, for encounters with turtles, barracuda, schools of sardines, whitetips, blacktips and whale sharks.

6 PADI

Highest Course offered
PADI Divemaster



www.cebufundivers.com
info@cebufundivers.com



DUCKS DIVING ROMBLON

PHILIPPINES
ROMBLON ISLAND
BARANGAY LONOS

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9 THRESHER SHARKS ON TAP



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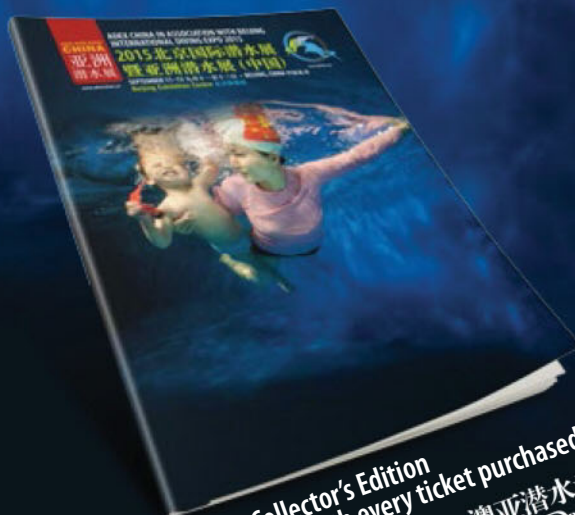
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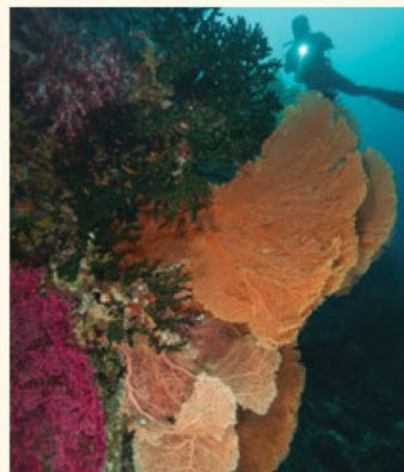
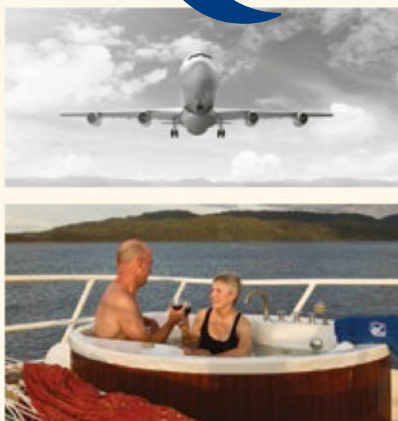
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FIJI

POSSIBLY THE BEST SHARK DIVE IN THE WORLD

By Warren Baverstock



Fiji offers picture-postcard beaches, pellucid, coral-filled waters, and a high-octane shark dive that sets an industry standard for an adrenaline-fuelled experience you will never forget.

There are many great shark dives in the world, but how many offer a multi-level dive all year round, on which you can have close encounters with up to nine different species of shark – blacktips, whitetips, grey reefs, silvertips, tawnies, sickle fins, lemons, tigers and bulls? The answer is only one.

Just 20 minutes by boat from Fiji's Pacific Harbor lies a very special marine park where, over the years, important shark research and conservation work has brought the marine life back to this once over-fished area. With support from both the Fijian government and the traditional owners of the area, as well as a lot of hard work from Beqa Adventure Divers, Shark Reef Marine Reserve, Fiji's first national marine reserve, has become a hugely successful eco-tourism shark project. What makes this site especially unique is the impressive numbers of bull sharks that visit the marine park throughout the year, and, although the temptation of food is the main encouragement for these sharks to visit, as I found out over my 12 days here, these sharks are far from being conditioned to just relying on eating fish scraps every day of the year; sharks that I saw at the beginning of my visit were no where to be seen by the end of it.

27 METRES: SHARK ENCOUNTER 1 OF 4 – PUTTING THE BINS OUT

As the group and I descended down the reef slope to the Arena my first bull shark came into view. I had seen nothing from the surface but as we approached the man-made reef wall, the sharks seemed to appear from nowhere. With great efficiency the whole group of divers were quickly guided into position behind the waist

1. CAMERA TIP: It can be a little dark at this depth first thing in the morning so try and push your ISO up to a maximum level that you know your camera is comfortable with and avoid kicking up the sediment. Fire off some test shots to get your strobe angle and power right before the feeding starts – just be mindful of not illuminating sediment that the sharks stir up.

2. CAMERA TIP: Even though the light is nice, use those strobes, reduce your ISO slightly and increase that shutter speed for these fast moving sharks.

high wall by the Beqa Adventure Divers divemasters. Equipped with their aluminum shark staffs, the supervisors spaced themselves evenly behind the group, ensuring that everyone was safe and secure.

Meanwhile, in front of the group, bull sharks of all sizes were now slowly cruising the length of the wall looking at their spectators very closely. From behind the curtain of bubbles created by the line of divers, Fabiano appeared, towing what looked like a wheelie bin. As he hovered 10 metres above the Arena, the sharks become less interested in the divers and more in Fabiano. Surrounded by a dense cloud of reef fish, Fabiano checked the shark's behaviour and, after being given the all-clear signal from the divemasters, the wheelie bin was inverted and the lid was partially opened. Slowly, several football-sized tuna fish heads tumbled gently into Arena and the languid sharks gave a display of just how fast and manoeuvrable they can be as they all rushed to be the first to reach the food. With great busts of competitive acceleration, but without bumping into each other, and in an almost orderly fashion, within moments the food was consumed. The sharks were now a little bit excited and

were swimming around more quickly. Fabiano allowed a minute or so for the sharks to regroup and settle.

Constantly monitoring their behaviour and communicating with the divemasters, he dictated the momentum of the feed, ensuring that it was conducted responsibly. As the feeding resumed, Gape, a pregnant, two-and-a-half-metre bull shark shot up vertically to grab the bait first and as the group followed her she snatched one of the fish heads and suddenly changed her course, swimming parallel to the line of spectators with her large mouth open displaying her prize for all to see.

Twenty fish heads later, the dive leader signalled that it was time to ascend to the next stage. We headed for shallower water, the divemasters following, guiding everyone safely to the next vantage point.

17 METRES: SHARK ENCOUNTER 2 OF 4 – SHARKS BEHAVING BADLY

With everyone in position for the next part of the dive, the divemasters performed a quick check to ensure everyone was paying attention. Prior to the dive, the group had been thoroughly briefed on the safety guidelines and on





The **BEQA ADVENTURE DIVERS** experience is planned and run by a team of highly trained professionals, who carry out their programmes in consultation with experts and in cooperation with the local authorities. These kinds of activities should never be attempted under any other circumstances.

For more information on BEQA's research and conservation work, please visit www.fijisharkdive.com/conservation

this part of the dive it was all about keeping your hands down and definitely not picking up any bits of food that might float past.

At no time do the sharks on this part of the dive ever behave badly towards the divers, but, unlike the bull sharks who are extremely well-behaved, the grey reefs and silvertips can get very excitable and sometimes forget their manners when it comes to feeding time.

Our feeding expert on this part of the dive was Papa, equipped with chain mail covering his hands and arms



3. CAMERA TIP: Warning! Photo Bombers! Take multiple shots of your subject as it moves in and out of your frame - there are many sergeant major damselfish that love to photo bomb photographs - use a fast shutter speed for increased frame rate.

minutes of feeding we watched as certain individuals tried to bully their way in front of the more well behaved sharks, but Papa and his buddy maintained impeccable control and ensured that bad behavior was not

rewarded. In no time at all it was time to ascend to the final part of the dive.

5 METRES: SHARK ENCOUNTER 3 OF 4 – A SAFETY STOP WITH A DIFFERENCE

The dive just kept delivering: More sharks on the safety stop. This time Mansa, in his chain mail, slid into position ready for the barrage of whitetips, blacktips and young grey reef sharks.

Lining the edge of the shallow reef, the sharks were patiently waiting amongst the shoals of snapper and other reef fish. Holding a horizontal roped line at five metres the group were able to observe the sharks perfectly as they slid down off the top of the reef to feed. With the safety stop completed, with a few extra minutes for good measure, the team exited the water to start their surface interval.

15 METRES: SHARK ENCOUNTER 4 OF 4 – RUSI'S BIG ENCOUNTER

During the 60-minute surface interval I spent time listening to Rusi and his Fijian comrades talk about the research that the project carries out as well as explaining their cultural relationship with the sharks that inhabit this reef and the surrounding waters. It was evident that they were extremely proud of their achievements and the conservational research work that they were part of.

It was not long before it was time for the final shark dive experience of the day and with everyone full briefed, we got back into the water. Lying down next to the sloping reef in a man-made gulley I had the perfect vantage point. I could see Rusi and two of his colleagues equipped with their shark staffs standing either side and just behind him. From the surface, Fabiano slowly descended with his wheelie bin and as he did, more bull sharks started to appear from the deeper water. Looking back down at Rusi, I noticed he had a large tuna fish head in his hand with a three-metre bull shark swimming up the reef towards him.

Very precisely, Rusi lured the shark away from him and, at the last moment, gently let go of the fish head, which was immediately engulfed by the jaws of the large shark. With a flick of its tail, the shark powered itself up through the cloud of damselfish and over the group. With several sharks now queuing up for Rusi to feed them, Fabiano opened the lid on his wheelie bin, which drew the sharks back into the blue water. As the team alternated between the two feeding stations, the sharks appeared

and with a divemaster with a shark staff as an extra pair of eyes just behind him. With everyone in position, the feed began and the rules of shark engagement were enforced from the very start: Only one shark may come in for food at any one time and although some may consider this to be conditioning, it is a discipline practised purely for the safety of the divers.

Within a blink of an eye a grey shark swept in and took the food from Papa's hand and instantly propelled itself off like a rocket over the heads of the group. Over the ten



4

4. CAMERA TIP: Warning: Photo Bombers! Take multiple shots of your subject as it moves in and out of your frame - there are many sergeant major damselfish that love to photo bomb photographs - use a fast shutter speed for increased frame rate.

to get closer to the group and, watching in awe, the time flew by. Finally, we heard the sound that we had all been dreading, and it was time to head up for our last safety stop of the day.

Over my two weeks with the Beqa Adventure Dive team I got to see how extremely well organised and professional this operation is, staffed by a team of truly unique, passionate people who really love the work that they do. As for the diving, if you love sharks you'll love this place and, once you visit it, you'll find yourself wanting to go back. **SDAA**



NAVIGATOR

Getting there:

The international airport is Nadi in the northwest of the main island Viti Levu. From there it is a 2.5-hour transfer by cab to Pacific Harbour on the Southern coast where Beqa Adventure Divers are based. Other local transportation is not recommended.

Best time to dive:

All year round. Summer is from November to May and the weather is hot and humid with little wind, warm water and acceptable viz. In winter from June to October it is cool and dry, windy, and the visibility is excellent. The bull sharks leave from October to mid-December to give birth and mate.

Don't dive without:

A 3mm in the summer, 5mm in the winter. For the shark dive a dark, full-body wetsuit and dark gloves.

Essential training:

Open water

On arrival:

Nationals of most countries can get a four-month permit to stay in Fiji on arrival. Check with your local embassy or consulate.

For more information:

www.fijisharkdive.com

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1 FJD: 0.5 USD

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The *Island Dancer II* is perfectly suited for Fiji and the diving itinerary and appeals to those discriminating divers who prefer a smaller group. All indoor areas are air-conditioned and each of the guest cabins feature ensuite facilities. The beautifully appointed salon has ample room for divers to view their photos and videos or to enjoy a movie on the entertainment system.



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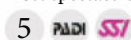


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13 THE WORLD'S LARGEST CORAL REEF SYSTEM IS IN AUSTRALIA

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14 POOR KNIGHTS ISLANDS MARINE RESERVE AND ITS STRANGE MIX OF... EVERYTHING

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15 ENDEMICS GALORE

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The Yonaguni district in Japan is home to strange formations that litter its underwater realm. So far, scientists have found structures that resemble pyramids, castles and even roads. Man-made? Natural? Nobody knows, though the stones appear to be fused to the sea bed, the search for answers is ongoing.



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The big attraction, however, are the schools of fish that patrol the reefs in colourful packs: humpback and black and white snappers, trevally, barracuda, batfish, unicornfish, yellowback fusiliers and harlequin sweetlips almost comical in design. The reef's larger inhabitants, including sharks, rays and occasionally even whale sharks, are often seen cruising in the blue.

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THE MAGNIFICENT MALDIVES



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The Historical Diving Society Asia (HDSA), a not-for-profit society established in Singapore to serve the Asian region, aims to educate and preserve the history of diving in all forms. It produces stories and information on Asia's diving history in every issue of *Asian Diver*, its official publication. All subscribers to *Asian Diver* automatically become members of HDSA.

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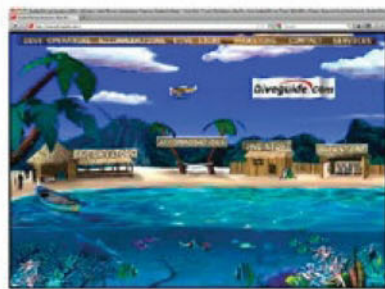
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By Underwater3some

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ALERT DIVER

The Magazine of Divers Alert Network Asia-Pacific



DANAsiaPacific.org / Quarter 1, 2015

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SUSTAINABLE SEAFOOD



On the Cover

A marlin hunts a yellowfin tuna at Nine Mile Bank off San Diego, California
Settings: f/10, 1/250s, ISO 320
Image © Richard Herrmann



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Alert Diver's Philosophy

Alert Diver is a forum for ideas and information relative to diving safety, education and practice. Any material relating to dive safety or dive medicine or accident management is considered for publication. Ideas, comments and support are encouraged and appreciated. The views expressed by contributors are not necessarily those advocated by DAN Asia-Pacific. DAN is a neutral public service organisation which attempts to interact with all diving-related organisations or persons with equal deference. *Alert Diver* is published for the use of the diving public and it is not a medical journal. The use and dosage of any medication by a diver should be under the supervision of his or her physician.

Alert Diver is published as a separate, independent magazine within *Scuba Diver AUSTRALASIA* (SDAA) magazine. DAN Asia-Pacific is not responsible for the content provided elsewhere within SDAA, and therefore this content should not be assumed to represent the views, policies or practices of DAN Asia-Pacific or *Alert Diver* magazine.

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PERSPECTIVES

Leading the way to collaboration on safety in the Asia-Pacific



In the previous issues of *Alert Diver*, I described the beginning of DAN Asia-Pacific's "Two Big Initiatives":

1. Working in partnership with dive industry leaders, businesses and organisations to increase "oxygen first aid preparedness" for remote dive operators, resorts and liveaboards, which involves having the right equipment, training, skills, and enough O₂ supply.
2. To improve remote medical clinics' ability to assess and provide early care to divers with suspected decompression illness. Early care includes providing fluids, 100 percent oxygen and, most important, an accurate neurological system examination and dive medical history, best completed by a physician.

We have made good initial progress on both initiatives. In mid-October, following the annual business meeting of the International DAN organisations (DAN America, DAN Europe, DAN Japan, DAN Southern Africa), which DAN Asia-Pacific hosted, we held a special meeting attended by representatives from major dive training organisations; NAUI, PADI, SSI, IANTD-Korea, and Korea Maritime and Ocean University, another Korean dive certification organisation.

Moderated by DAN Asia-Pacific, the meeting offered attendees an opportunity to share information and learn about the challenges of

remote dive injuries and DAN's two big initiatives. Ideas and information were also shared about dive emergency planning and there was support for further communication and sharing of information in support of DAN's efforts to improve oxygen first aid preparedness and remote clinics' ability to provide care and assessment of injured divers. DAN will fund a pilot seminar for remote clinic physicians in 2015.

DAN's new Oxygen First Aid for Divers poster (pictured opposite) was well received and distribution has already begun. Dive stores may obtain this poster, free, by emailing oxygen@danap.org. Importantly, the poster highlights the effectiveness of different equipment in providing O₂ to an injured diver. Arming operators with this knowledge will assist them in purchasing the right equipment to help their customers, should they need it.

Dive professionals, dive store owners and operators are increasingly realising that O₂ preparedness makes good business sense!



Be prepared. Learn more at www.danap.org/oxygen.php

Safe Diving,
Chris Wachholz, CEO

↓ The DAN Asia-Pacific team





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Non-rebreather mask.

- 3 one-way valves
- flow rate of 10-15 lpm
- don't let reservoir fully deflate

(Can provide 70-90% O₂)



Simple face mask and nasal cannula.

(These only provide 25 to 50% oxygen so it is NOT ideal for scuba divers.)

NON-BREATHING DIVER

Ventilate with:



- **Resuscitation Mask**
(flow rate 15 lpm)
- **Manually-triggered ventilator**
(requires 2 operators)
- **Bag-valve Mask with reservoir**
(requires 2 operators)

IMPORTANT
Ensure you have enough O₂ to last until a diver receives good medical care.



RULES FOR GIVING OXYGEN

If a diver has symptoms of Decompression Illness:

- Administer Oxygen Immediately
- Call the DAN (DES) Hotline
- Keep on O₂ until advised to stop by a Dive Medical Specialist. (Often 4 to 5 hours and sometimes overnight)
- Use in a well-ventilated area with no sources of ignition

For diving emergencies, call the DAN (DES) Hotline: +61-8-8212 9242

Dive Professionals: DAN Can Help You Get Prepared.

Visit danap.org/oxygen.php or email oxygen@danap.org

Sustainable Seafood

Making smart choices to save the oceans

By Alison Barratt



Divers are probably more connected to the wonders in the oceans than most people, and those who have been diving the same sites for any length of time have seen the changes firsthand. Overfishing, excessive collecting, pollution, habitat damage and changing environmental conditions all are having an impact on ocean ecosystems.

Overfishing of large predators like sharks for their fins, or bluefin tuna for sushi, is having devastating consequences on the oceanic food web. Scientists estimate that only 10 percent of predators at the top of the food chain remain, and the effects of their absence ripple throughout the system. Yet the hunt continues.

Coral reefs, the favoured habitats of many divers worldwide, are reflecting the consequences of ocean warming, and changes in ocean chemistry are affecting coral polyps' ability to build their skeletons. This inability to regenerate efficiently has a domino effect, as entire communities of reef fishes and marine animals rely on coral reefs for food and shelter.

With wild-caught seafood falling short of the growing global demand, seafood farming is on the rise. Last year, for the first time, more than half of all consumed seafood was raised in farms. Unfortunately, not all farming gives the ocean a break; by farming top carnivores like salmon and tuna, additional pressure is put on our oceans as wild fish are caught to feed the farmed fish. On top of that, pollution, disease and other concerns associated with intensive farming in open-water environments are an increasing threat around the world.

But it's not too late to turn the tide. There's something all of us can do – and it's easy (especially if you like to eat seafood). By making conscious individual choices when ordering seafood, a huge collective difference can be made.

Education about what is sustainable and what is not is key to knowing what choices to make, and there are several resources available to provide ready access to the information. One of the leaders in the fight for sustainable seafood,

“Scientists estimate that only 10 percent of predators at the top of the food chain remain, and the effects of their absence ripple throughout the system”

↑ The decline in fish stocks is unsurprising in light of scenes like this one
Image © Gregory Wrona/
Alamy



the Monterey Bay Aquarium, has been putting the “Best Choices” guide in people’s wallets since 1999. The Seafood Watch pocket guides are tailored to each region of the United States to provide information about locally available choices, and there is a national sushi guide with the English and Japanese names of popular types of sushi.

Recommendations are also available via a free Seafood Watch app for the iPhone and Android. The app is a great resource for travellers, as it automatically pinpoints your current location and serves up seafood choices for the region you’re in. The app includes “Project FishMap”, a feature where users across the country can

help identify where they’re finding sustainable seafood choices and tagging those restaurants or markets for others to see. The sharing of information allows others who want to make good choices find these locations when they’re shopping for ocean-friendly seafood.

Asking questions of fishmongers or restaurant wait staff can identify seafood fished or farmed in environmentally responsible ways. By selecting these items, consumers vote with their wallets for best practices and support the building of sustainable markets for ocean-friendly products.

The votes count; big businesses are listening to what customers are saying. A number of major seafood buyers are now working with the Monterey Bay Aquarium to help bring an end to overfishing and other environmentally destructive practices. Your continued demand for seafood from well-managed farms and fisheries will help keep our oceans healthy, giving your children and grandchildren the chance to dive in and enjoy the full bounty and beauty of our oceans.

↑ Apex predators such as tuna play a crucial role in marine food chains and in the oceans’ overall health
Image © Richard Herrmann

I Didn't Want to Ruin My Dive Holiday

Suffering from a good dose of denial

By John Lippmann, DAN AP Founder, Chairman and Director of Research

CASE REPORT:



Emily (not her real name) is a healthy 39-year-old woman who was diving in Tulamben, Bali. She had completed a total of 49 lifetime dives, most of which had been shallow shore dives. Prior to this trip she had not undertaken more than two dives in a day nor had she completed several consecutive days of diving. She had no previous episode of decompression illness. On this trip, the diver completed all dives on air, except Day 2, where the dives were on nitrox with a dive computer air setting.

DAY 1

Dive 1: 20m, total dive time (TDT) 54 mins, surface interval (SI) 1.5 hrs.

Dive 2: 19m, TDT 65 mins, SI 2 hrs.

Dive 3: 22.8m, TDT 62 mins.

That evening Emily felt slight pain that she described more as pressure. She had some redness under her left breast that she dismissed as wetsuit irritation. It disappeared overnight and she felt fine the next morning.

DAY 2

Dive 1: 23.6m, TDT 61 mins, SI 1.5hrs.

Dive 2: 27.5m, TDT 48 mins, SI 2 hrs.

Dive 3: 26.1m, TDT 51 mins.

During the second dive, Emily's computer went into deco so she ascended slowly and stayed at a shallower depth for the remainder of the dive. Her computer remained in deco during Dive 3 and she reported that alarms and warnings sounded throughout the dive. Upon showing the dive guide he indicated that his computer was still within limits, so they ascended slowly and made the usual safety stop.

Immediately after this dive the diver felt a pressure like pain in both breasts and around her waist. She had a rash/bruising all over her chest and some small patches on her torso and back. The rash on her torso/back disappeared after a short time but remained on her chest for a few hours. Her head felt foggy and she was

very tired. She had complete loss of appetite but forced fluids down. Whilst she was passing urine, she noticed that her rate of urine output was minimal.

DAY 3

Dive 1: 26m, TDT 52 mins, SI 2 hrs.

Dive 2: 23.1m, TDT 51 mins.

By the morning of Day 3 the rash had disappeared but Emily was worried about it. She mentioned it to her dive group, but it was dismissed as a general skin irritation. She mentioned it to the dive guide who thought it might be a bite and nothing to worry about. She didn't discuss it further and decided to complete only two dives. In between the dives she noticed the rash again, which was painful. Immediately after Dive 2, the diver had very painful purple blotches all over her chest, which quickly turned pink, so it looked like sunburn. Her head was very foggy and she still had no appetite.

DAY 4

Dive 1: 26.9m, TDT 48 mins, SI 1 hr.

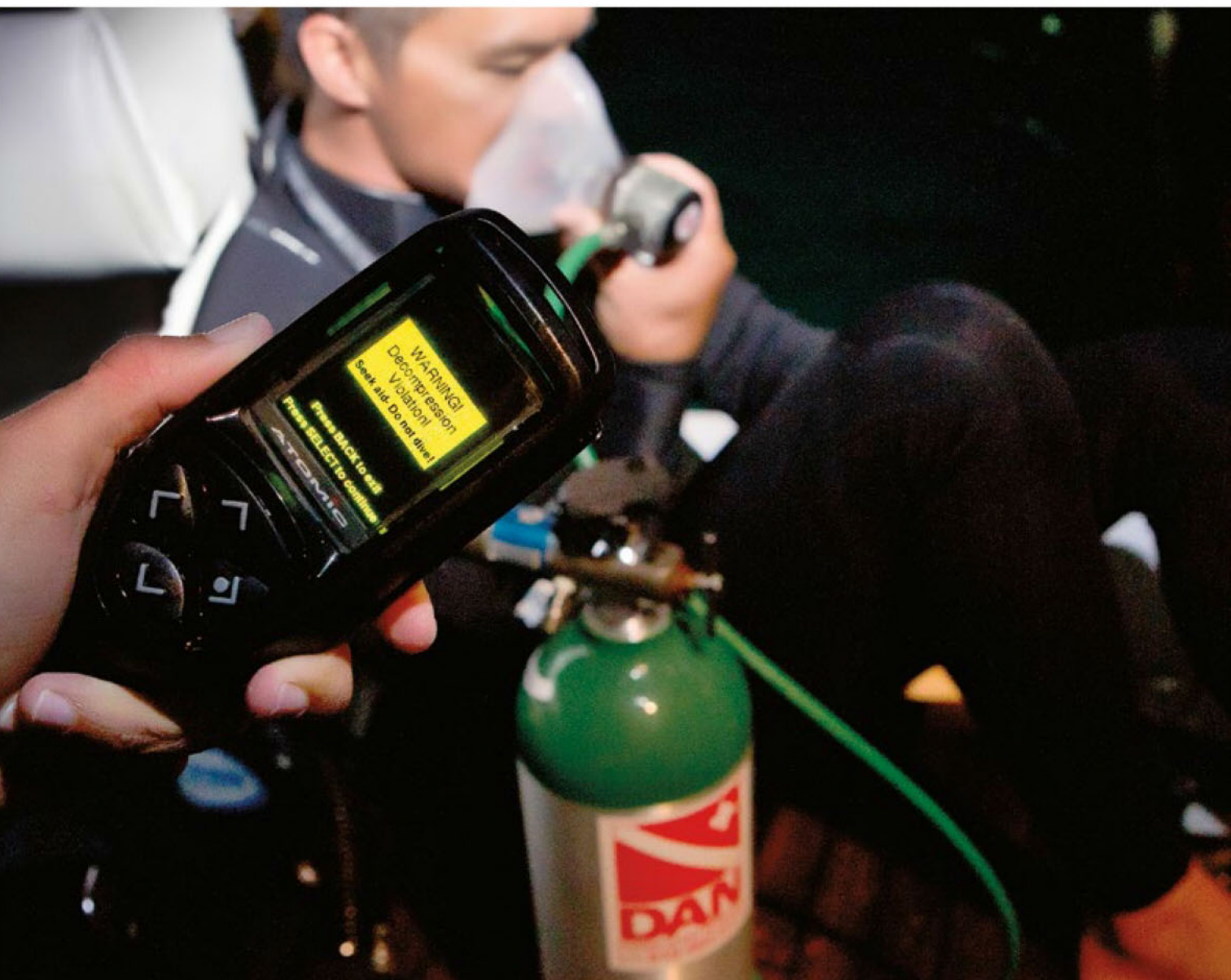
Dive 2: hr, 21.4m, TDT 54 mins.

On the fourth consecutive day of diving Emily decided to complete only two dives as, despite feeling okay, she was still concerned about the rash. Upon surfacing from the first dive the rash was present and very painful. Dive 2 was to a site the diver didn't want to miss out on and due to a scheduling issue, the surface interval was reduced to only one hour. On completing this dive Emily knew she had a skin bend, and needed advice, so she called John Lippmann at the Divers Alert Network (DAN).

Upon DAN's recommendation, Emily breathed O_2 at the dive centre but she did so for only one hour then left against DAN's advice in order to make the three-hour trip back to her hotel. Initially the operator gave her nasal prongs; fortunately she remembered from having completed the DAN Oxygen First Aid course that she needed a demand valve or non-rebreather

* Images used are representative only and do not depict the divers in question





“The diver was suffering from a very good dose of 'denial', also very common: I can't have DCI – I followed my computer – I'm on holidays and have other dives to do and don't want to miss them – it must be something else!”

mask to receive a higher level of O_2 . She also knew to increase the flow rate from the 4 litres per minute (lpm) it was on to 12lpm with the non-rebreather mask (Ed Note: 10-15lpm is the recommended oxygen flow rate for a non-rebreather mask).

That night Emily was in a lot of pain, including pain between her shoulder blades and armpits. The following day she felt clearer in

the head but had a lot of swelling, especially in her legs. For the next few days she felt awful, but did not present at the chamber as DAN recommended, nor did she breathe any more O_2 . When asked why, Emily said: “I didn't want to ruin my holiday!”

On returning to Melbourne the swelling disappeared, however, Emily still experienced pain for two weeks and mental foginess that lasted a month.

The diver has since undergone testing and been confirmed for a patent foramen ovale (PFO) and an atrial septal aneurysm.

DISCUSSION

Dive Profiles

Although not uncommon, the profiles completed were certainly likely to have created significant bubbling in Emily's body tissues and blood. It is well known that nitrogen bubbles occur

commonly after many recreational dives, even within no-deco limits of dive computers and tables. These bubbles are usually asymptomatic and are generally believed to be harmless, being filtered out by the tiny blood vessels in the lungs. However, it is wise to minimise the amount of bubbling and this is where conservative diving practices such as shallower depth, reduced dive times, fewer dives, slow ascents, safety stops, and diving nitrox on air times can assist. It also takes time for the bubbles to disappear and this is where extended surface intervals can be beneficial.

Denial

The diver was suffering from a very good dose of 'denial', also very common: I can't have DCI – I followed my computer – I'm on holidays and have other dives to do and don't want to miss them – it must be something else!

It was unfortunate that the dive operator had never heard of a skin bend and that the diver's friends didn't consider that the rash could have been DCI as it made it more difficult for Emily to accept there was a problem and act earlier. It's important the message gets out that a blotchy rash after diving should make one suspect DCI and proper advice should be sought and acted upon.

Ignoring Computer Warnings

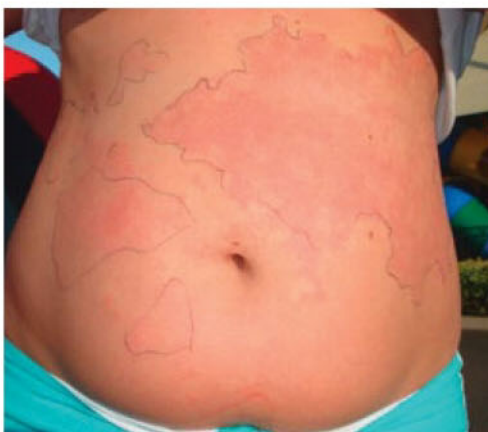
I was unimpressed that the dive guide ignored the warning of the dive computer and appeared to assume that, if she was diving within the limits of his computer, she was OK. This shows a real lack of knowledge, and is unfortunately not that uncommon.

Assessment

When Emily described her symptoms, I knew DCI was likely, so she needed good oxygen administration, likely diving medical assessment and possibly treatment. On returning to her hotel in Sanur, she had to travel over a mountain pass, and I was concerned that her symptoms could increase with the altitude. I suggested that she breathe high concentration oxygen for three to four hours before she began the journey. I offered to arrange this but she was with her dive operator, who had oxygen equipment, and I was assured that it was in hand. I also requested a call-back. When I hadn't heard back for a few hours, I called and found out that Emily had only breathed O₂ for one hour.

O₂ Delivery

Initially, as the diver reported, the delivery of O₂ was far from ideal, with a flow rate far too low to be effective, particularly for a diver who



← Skin bends can be quite distinctive but often go undiagnosed
(Image used for illustration only and does not depict the diver in question)

has chosen to receive O₂ first aid for only one hour. It's important that dive operators have suitable equipment and many hours of oxygen supply to deal with such situations. Sometimes the equipment needs to go with the diver to enable them to breathe oxygen on the way to the treatment facility so a spare set and supply should be available in case it is needed by other divers.

Ignoring DAN's Advice

When the diver informed me that she'd travelled over the mountain pass, I suggested that I could arrange for her to be assessed at the local chamber and advised this would be prudent. However, she assured me she was OK and she'd let me know if things worsened again. I called her the next day and she said she was feeling quite well, despite an unsettled night. The dose of denial was still pretty strong! I shouldn't have believed her and more strongly asserted that she sought proper assessment. It is likely that Emily would have benefitted from recompression treatment.

Skin Bend Recognition

A red or bluish blotchy rash (sometimes with underlying swelling) is a very common sign of DCI in a diver with a PFO. Divers often put the rash down to a sting or a wetsuit allergy or other skin irritation but, in my experience, it is far more often DCI-related. So it wasn't a surprise to hear that testing confirmed Emily has a significant PFO. The previous dives she had done before this trip were mainly shallow dives with fewer repetitive dives. The dives she'd done in Tulamben were more aggressive and bubble-provoking. Emily now has to make a decision on whether or not to restrict herself to very conservative diving, or to undergo surgery – a difficult decision for most divers diagnosed with a PFO. To read more about PFOs see "Expert Opinions" on the next page.

We present these cases to remind you that DAN is available 24/7 to answer questions, help with medical emergencies, arrange hyperbaric treatment and facilitate emergency evacuation through our 24-Hour Diving Emergency Hotlines.

IF YOU NEED HELP, CALL:
1800-088-200
(toll free within Australia – English only)

+61-8-8212-9242
(from outside Australia – English only)

PFO and DCI in Recreational Divers

Top medical researchers debate the risks of the condition and the treatment

By Petar Denoble



Patent foramen ovale (PFO) is a relatively benign cardiac defect that creates a passage in a wall that normally separates the left and right upper chambers of the heart. PFO is found in about 25 percent of adults, most of whom will never know they have it. The passage may open in certain circumstances and enable venous blood to pass through to the arterial side of the heart; this is a unique concern for divers. If gas bubbles form after a dive, the venous bloodstream will carry them to the right side of the heart. In divers with PFO, the bubbles could pass through the opening, bypassing the lungs and theoretically putting the diver at an increased risk of decompression sickness (DCS).

but an evidence-based risk-benefit analysis is not available, and PFO closure as a means to prevent DCS remains controversial. Most diagnosticians recommend the procedure only in cases of repeated “undeserved” DCS – or DCS occurring without clear causative factors – involving the skin, brain or inner ear. To shed light on this poorly understood topic, we asked recognised experts to provide their opinions regarding three questions of interest for divers concerned with PFO testing and PFO closure.

SHOULD DIVERS BE TESTED FOR PFO?

Dr. Alfred Bove: There is no indication for a diver to have a routine screen for a PFO. A PFO is present in 25 to 30 percent of all people. DCS is caused by excess super-saturation of inert gas with subsequent bubble formation in blood and in tissues, and not by a PFO. Bubbles in the venous blood may cross a PFO, but there are many cases of DCS in divers without a PFO, so other factors need to be considered. Several studies have shown that a PFO will increase the risk of DCS; however, the DCS risk remains miniscule even with a PFO. The most common neurological manifestation of DCS is spinal cord injury, and the correlation of this disorder with a PFO is weak, as is the relation to musculoskeletal DCS.

Dr. Peter Germonpré: No. PFO is so common, and decompression sickness is so rare that the systematic testing for PFO would cause more concern than it would do any benefit. There are other shunts of blood possible (e.g., at the level of the lungs), and there are other factors that may promote DCS. All divers need to be aware that any decompression bubbles, when present, may provoke DCS, and they should dive so as to minimise those bubbles.

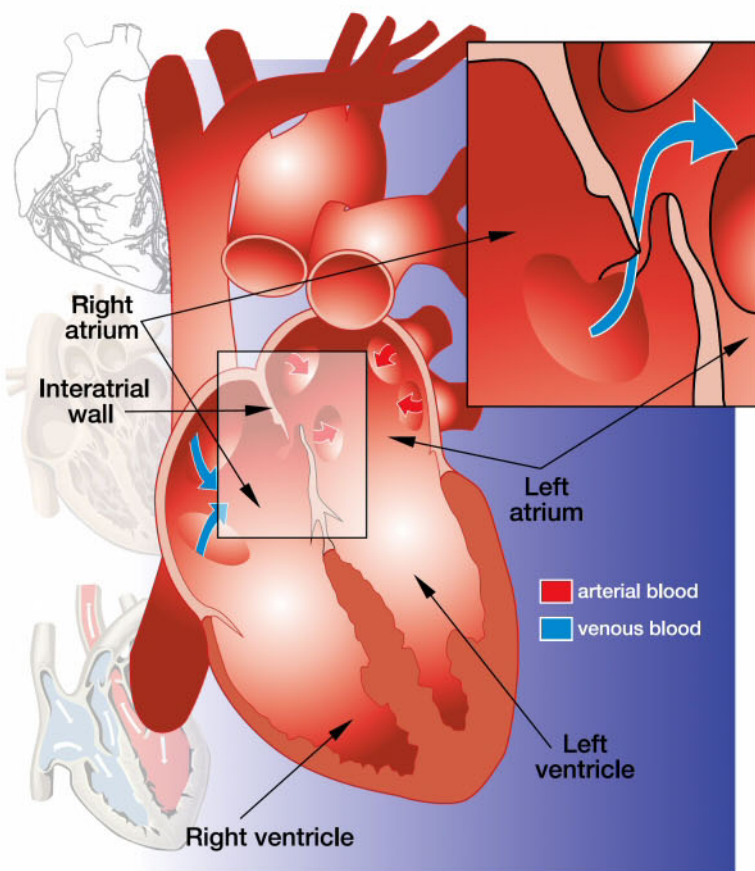
Dr. Richard Moon: It is important to keep in mind several issues. First, the relationship between PFO and DCS is an association. While there is a plausible explanation for the apparent connection (i.e., DCS triggered by arterial bubbles), this is not yet proven. Indeed, PFO has not been linked to the most common symptoms such as pain-only bends, numbness,

“The incidence of PFO is two to six times greater in divers who experience a neurological DCS hit...”

A number of retrospective studies have established that the incidence of PFO is two to six times greater in divers who experience a neurological DCS hit; however, these studies do not prove PFO is the cause of DCS symptoms. The only prospective study designed to measure how PFO affects the risk of DCS is ongoing. A similar association without causative relation was established for PFO and migraines as well as PFO and coronary heart disease. These conditions may be inherited in a similar way and thus may appear in the same people, but they do not necessarily cause each other. Many divers who get DCS do not have a PFO, and many divers with a PFO do not get DCS. Even if PFO is a risk factor for DCS, the risk is very small due to the low incidence of DCS. The risk can be additionally reduced by avoiding dive profiles that are likely to generate a lot of bubbles.

It is reasonable to expect that closing the PFO would reduce the risk of DCS; however, there are no consensus criteria for PFO closure in divers. Divers have been undergoing transcatheter closures for years,





↑ Diagram showing the anatomy of a PFO

tingling or fatigue. Second, PFO exists in 25 to 30 percent of people, and studies have shown that venous bubbles are extremely common after recreational dives. Therefore, many divers must be experiencing arterial bubbles, yet DCS is extremely rare (especially the more serious variety that is associated with PFO). Third, if the bubble explanation is correct, a PFO could precipitate DCS only after a dive of sufficient depth and duration to generate venous gas embolism. PFO is therefore unlikely to be a factor for mild DCS cases or ones that occur after short exposures or shallow depths (i.e., “undeserved”). Finally, most cases of DCS occur in divers without a PFO. It is difficult or impossible in an individual diver to ascribe a particular DCS occurrence to a PFO, as PFO will exist in nearly one-third of cases even if there is no causal relationship. Therefore, testing for a PFO is useful only in instances where there have been several DCS incidents of a type known to be PFO-associated, and the person cannot modify depth-time exposures or breathing gas.

WHAT IS AN ACCEPTABLE INDICATION FOR PFO CLOSURE IN DIVERS?

Germonpré: If a diver has suffered DCS, a systematic search for possible contributing factors should be undertaken. This involves analysing the dive and circumstances around it and also medical factors such as PFO or pulmonary abnormalities. If any of these factors

are found, a suitable preventive strategy may be advised. Current statistics indicate that the possible risks of PFO closure are much larger than the risk for DCS when diving within no-decompression limits. In a few years we may have precise figures when the prospective Carotid Doppler Study from DAN Europe is concluded. There are measures that can be taken to decrease further the DCS risk in recreational diving such as diving nitrox on air tables. Therefore, we recommend PFO closure only in specific cases:

- professional divers, who are required to dive with imposed dive profiles and cannot adapt their diving behaviour
- sport divers where no other contributing factors for DCS could be identified and who [experienced DCS after] a “low-risk” dive profile

In any case, the decision to close a PFO must be taken only after thorough information review, analysis of the risks and explicit consent.

Moon: A commercial diver (e.g., offshore worker, dive instructor) who has experienced several DCS incidents of a type known to be associated with PFO (e.g., neurological), and who is not in a position to increase the oxygen percentage in his/her breathing gas or modify depth-time exposures [might consider PFO closure].

Bove: I would not recommend PFO closure in any sport diver, whether or not the diver had a DCS incident. The noted incidence of DCS in recreational divers is between two and five cases per 10,000 dives (0.02 percent to 0.05 percent). The serious complication rate for PFO closure, as noted in Dr. Douglas Ebersole’s comments (see sidebar), is three to four percent, more than 100 times the risk of experiencing a DCS event. It is clear that the risk-benefit ratio for PFO closure in divers strongly favours not closing the PFO. Further, the presence of a residual PFO after closure is significant, up to 30 percent in some studies.

IF DIVERS CONSIDER PFO CLOSURE, WHAT RISKS AND BENEFITS DO THEY HAVE TO TAKE INTO ACCOUNT?

Moon: The benefit cannot be absolutely predicted, as in a particular diver it is not possible to ascribe DCS to a PFO with certainty. PFO is only one of probably several individual factors that may confer an increased risk of DCS, although most such factors have yet to be discovered. No invasive medical procedure is entirely without risk, and PFO closure is no exception. Even though the risk is low, a diver must balance it against an uncertain benefit. Other methods, such as reducing depth

or bottom time, or using enriched oxygen mixtures, are safer.

Bove: Most DCS cases with or without a PFO are related to excess exposure to depth and time. Diving within the no-decompression limits will have a much greater effect on reducing the incidence of DCS than will closure of a PFO. The risks of closure are well explained in Dr. Ebersole's comments (opposite). There is little knowledge of the long-term effects of implanting the device. Some cardiologists feel that the presence of a PFO occluder would prevent the use of a very effective method for treating atrial fibrillation (catheter ablation). There have been several case reports of commercial divers who experienced repeated incidents of DCS following deep saturation dives, and the frequency of symptoms was reduced after PFO closure. So there are likely to be occasional cases where PFO closure would be warranted in a diver, but this would not apply to recreational divers.

Germonpré: After PFO closure, one of the possible shunts from right to left has been eliminated. There is, however, no guarantee that closure is successful, and even if no shunt remains, some divers keep having recurrences of DCS, probably because other shunts open. In our experience, minor complications (cardiac rhythm disturbances, migraine attacks, bleeding) are not so rare. The long-term outcome of these devices has not been defined; most of the current devices have been on the market only a number of years. The presence of a "foreign body" inside the heart wall may, with age, cause other and more serious cardiac troubles. Finally, it is rarely possible to pinpoint one single cause for DCS; remedying one single factor does not "immunize" a diver from DCS.



MEET THE PANEL

Alfred A. Bove, M.D., Ph.D., is the former chief of cardiology at Temple University Medical Center in Philadelphia, Pa., emeritus professor of medicine and the immediate past president of the American College of Cardiology. He has authored texts on coronary disease, exercise medicine and dive medicine. He maintains an active clinic cardiology practice, with emphasis on heart failure and cardiac transplantation, sports cardiology and undersea and hyperbaric medicine.

Peter Germonpré, M.D., is the medical director of the Centre for Hyperbaric Medicine of the Military Hospital in Brussels, Belgium. He is also the DAN Europe

(Benelux) medical director and senior researcher of the DAN Europe Research department, where he coordinates the DAN Europe PFO studies.

Richard Moon, M.D., has been associated with DAN since its formation, first as medical director and then as senior medical consultant. He is a professor in the departments of anaesthesiology and medicine at Duke University Medical Center in Durham, N.C., and medical director of the Duke Center for Hyperbaric Medicine and Environmental Physiology. In 1989 he published the first analysis demonstrating a link between serious decompression illness and PFO.

PFO: Your Questions Answered

By Douglas Ebersole, MD

Q: What is a PFO?

A: A patent foramen ovale (PFO) is an incompletely sealed wall between the right and the left atria (*see illustration*). Prior to birth, this wall develops from the septum primum, which grows upward, and septum secundum, which grows downward. These septa overlap, providing a "trap door" (the foramen ovale), which allows oxygenated blood from the mother's placenta entering the right atrium to pass to the left atrium. At birth, the lungs expand and the pressure in the left atrium "slams shut" the foramen ovale. Shortly after birth, the "door" fuses in most people, but in about 27 percent of people it fails to fuse completely and results in a PFO.

The prevalence of PFO in divers with DCS is two times greater than in the rest of the population. In divers with neurological DCS, it is four times greater. The risk of DCS seems to increase with the size of the PFO. Based on these statistics, it is assumed that divers with PFO are at greater relative risk of DCS than divers without PFO; however, the only prospective study designed to measure directly the relative risk for DCS in divers with PFO is ongoing.

Q: How is a PFO diagnosed?

A: The diagnosis is made by injecting a small amount of air into a vein and observing its passage through the heart by echocardiography. An echocardiogram is performed by placing the ultrasound probe on the chest. Transthoracic echocardiography (TTE) is easy and noninvasive, but it detects a PFO in only about 10–18 percent of the population, around half of those who may have it. Transesophageal echocardiography (TEE), where the probe is passed into the esophagus after local anaesthesia and intravenous sedation, detects PFOs in 18 to 33 percent of the population. Even if TEE is more sensitive than TTE, there are many "false-negative" results with both techniques, and it is important to realise that a well-conducted TTE with a proper technique may be more reliable than a TEE.

Q: What is transcatheter PFO closure?

A: Transcatheter PFO closure is the implantation of an occluder device across the PFO through a catheter inserted via the femoral vein in the groin. The occluders come in various shapes and forms, but most act like a double umbrella that opens on each side of the atrial wall and seals it.

With time, tissue grows over and completely covers the occluder surface. The implantation procedure is performed in patients under local anaesthesia and intravenous sedation while the patient remains conscious. It takes less than one hour and can be performed on an outpatient or one-night-stay basis. Most patients can return to normal activity in two days, but they must take anti-coagulation medication and blood thinners for three to six months. Other restrictions include: no elective dental care (such as cleanings) for three months, no contact sports for three months, and no heavy lifting for one week. After implantation, divers must abstain from the sport for three to six months.

Q: What are the outcomes of transcatheter PFO closure?

A: Note: Due to the lack of data in divers, we present outcome data in patients undergoing PFO closure for the prevention of stroke. These patients have underlying medical conditions that may contribute to adverse outcomes.

Q: Should I be worried?

A: No. PFO is so common and DCI is so rare that there is no reason to be tested except, possibly, in the event multiple cases of DCI, or DCI after "low-risk" dives. A PFO can only be problematic in diving when dives are of sufficient depth and/or duration to cause venous gas bubbles. The incidence of DCS in recreational divers is between two and five cases per 10,000 dives (0.02 percent to 0.05 percent), and the majority of cases of DCS occur in divers without a PFO.

Efficacy

- Complete closure of shunt: 95 percent
- Incomplete closure: 4 to 5 percent
- No improvement of shunt: 1 percent

Complications

- Overall mortality: 0.093 percent
- Rescue operation for device adverse events: 0.83 percent
- Serious complications:
 1. Death, stroke, infection, bleeding, blood vessel injury: 0.2 percent
 2. Device movement or dislodgement: 0.25 percent
 3. Clot forming on device: 0.3 percent
 4. Major periprocedural complications: 1.2 percent.
 5. Minor midterm complications: 2.4 percent

Going on a Dive Trip?

STOP!

Before you do

JOIN DAN!

Emergency Evacuations
Can Cost More Than \$100,000

Wherever you are, DAN is there for you, 24/7

"My wife and I are eternally grateful for the amazing support we received from DAN. I had no idea how stressful an incident would be on my partner and I. It was so reassuring to get competent support and human comfort at the same time. Next time you think that you don't need DAN membership, think twice!"

— Dirk, Australia

Your Dive Safety Association



INCIDENT PREVENTION + INCIDENT MANAGEMENT + INCIDENT PROTECTION

DAN Members enjoy benefits such as:

- + 24/7 Medical Hotline
- + Worldwide Emergency Evacuation Coverage
- + 12-Months Peace of Mind
- + Travel Assistance Benefits
- + Access to Dive Injury (Treatment) Insurance Plans
- + Subscription to DAN's quarterly *Alert Diver* magazine, now included inside *Scuba Diver Australasia* magazine
- + Member-Only Portal Access

Dive Accident/Illness Treatment Insurance

For comprehensive coverage add a Dive Accident Insurance Plan to your Membership to be covered for treatment expenses associated with a covered diving accident/illness.



DAN Helped Me

"I've dived for 10 years and completed 700+ dives and I never thought I would have DCI, but I did. Thanks to DAN I was able to recover very well. I hope you are covered by DAN, so you too will have someone to count on in the very possible event of a scuba diving accident. DAN was of great help from the moment they received the call about my condition; their professionalism and care was so efficient and touching."

— Seung Hee, Korea

Not Yet a DAN Member?

Join today.

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On-board Oxygen

Why every boat needs an adequate O₂ supply

Text by John Lippmann and Mel Cefai
Images* by Stephen Frink



As many readers will know, DAN Asia-Pacific has launched our Oxygen Awareness and Preparedness Campaign in an effort to encourage more dive operators to be prepared to help divers in need of oxygen first aid. Additionally, we are encouraging divers to be proactive by choosing operators who are fully prepared to provide emergency assistance.

LIVEABOARD, MALAYSIA: OPERATOR UNPREPARED

During a surface interval on his second day of diving, the diver's symptoms commenced with chest pain, which felt to him like a muscle strain. Upon lying down, the diver felt nauseated, the chest pain intensified, and severe itching began on his chest and stomach. Red welts appeared and spread, covering most of the diver's torso. He sought the advice of the divemaster, who suggested it was an allergic reaction. The diver considered this a possibility as he had eaten a seafood lunch.

Over the following hours the rash became dark red and very painful (to touch and with movement), although the itching subsided. The diver then sought the advice of the captain, who was also a divemaster. The diver proposed breathing oxygen, but the captain was positive it was an allergic reaction. Although doubtful, the diver allowed himself to be persuaded to "wait and see". By the next day the rash had improved but the diver was still in some pain. His wife spoke to the captain and suggested that although it might not be bends, oxygen was worth a try. The captain agreed. It was then discovered that the boat's emergency oxygen cylinder was empty, and so some oxygen was decanted from the vessel's nitrox supply. Fortunately the diver's symptoms subsided, and by the next morning the rash had all but disappeared.

ANALYSIS

The divemaster and the captain should have provided oxygen readily rather than the diver and his wife having to ask for it. On a liveaboard it is of particular importance to be prepared to administer oxygen first aid as the distance to proper treatment is often substantial. The diver was wise to have ceased diving – continuing



would likely have intensified his symptoms and worsened his condition.

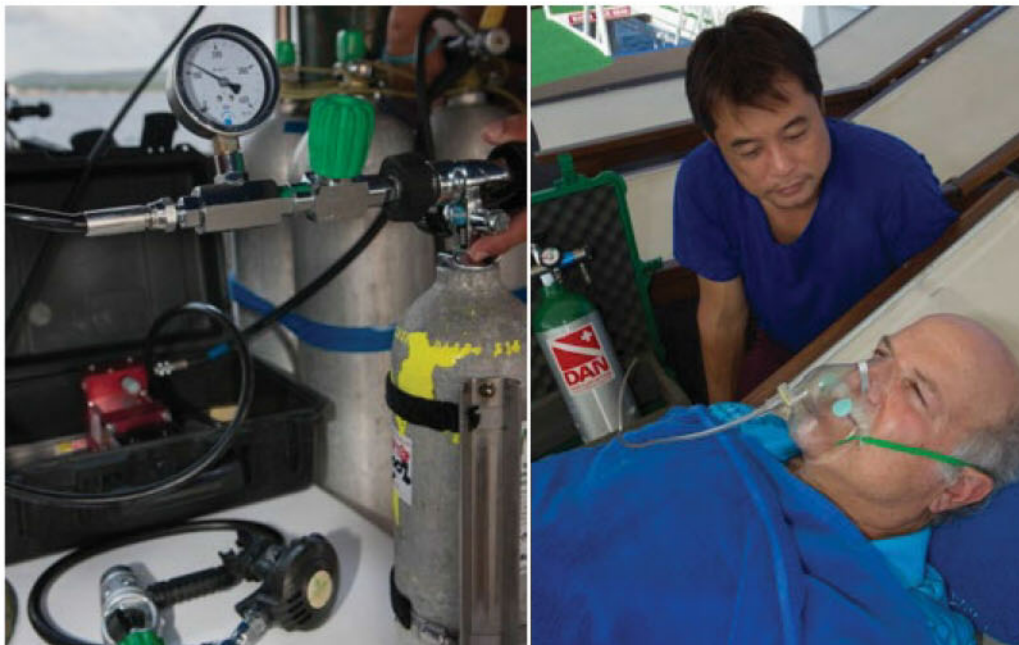
In the event of symptoms after diving, it is inappropriate and unwise for a divemaster or captain to withhold oxygen because they don't think a diver is suffering from DCI. Although dive professionals are taught about recognising symptoms and administering first aid for DCI and other diving accidents, this instruction is relatively basic, and most have little or no additional experience in diving medicine. For this reason, most dive professionals – and divers – should never put themselves in the position of trying to diagnose a medical problem such as DCI.

MALAPASCUA, PHILIPPINES: EMERGENCY PLAN IN PLACE

Not wanting to miss an opportunity to see thresher sharks, the diver splashed for his third early-morning start in a row, despite feeling tired. On the way back to shore he began to feel a minor tingling in his knees. Knowing

→ Dive operator staff should be willing and able to administer oxygen to all divers with suspected DCI

* Images shown here are representative only and do not depict the divers in question



← As soon as DCI is suspected, divers should be given high-concentration oxygen to breathe, and a DAN Hotline called for advice

“Oxygen should be available wherever diving is conducted. Even if a dive site is only 15-20 minutes from shore.”

something was wrong, he immediately asked for oxygen. The boat was equipped, and the diver started breathing oxygen straight away. He continued doing so until the boat arrived on shore approximately 25 minutes later, at which point the dive shop manager checked the diver's symptoms and immediately called the DAN Diving Emergency Services hotline.

DAN advised the diver to breathe 100-percent oxygen for a few hours and, fortunately, the operator was adequately prepared for this. The diver's condition did not improve, so he had to travel by boat and car to reach a chamber in Cebu. The operator was very well prepared, and the diver was able to breathe oxygen the entire way (nearly four hours) and was accompanied by a staff member from the dive centre.

The diver underwent one hyperbaric treatment, to which he responded well, and he made a full recovery.

ANALYSIS

This diver was fortunate that the operator he chose was so well prepared and he was able to breathe oxygen (although the concentration is unknown) from the onset of symptoms to his arrival at the chamber. He still required treatment, but one wonders what the condition might have been had the

operator been unprepared. He might have been considerably worse and may have required multiple treatments and/or been left with residual symptoms.

IS YOUR DIVE OPERATOR PREPARED?

Oxygen should be available wherever diving is conducted. Even if a dive site is only 15-20 minutes from shore, what may seem to be a short delay can sometimes affect the extent of recovery, or in some instances, the chance of survival – especially in the event of a cerebral arterial gas embolism (i.e., bubbles in blood vessels that supply the brain).

Before you book your next dive trip, make sure you ask the operator the following questions so you know you will be looked after in an emergency:

1. Is oxygen available on all dive boats?
2. Can the operator's equipment provide high-concentration oxygen to both breathing and non-breathing divers?
3. How many hours of oxygen could they supply? Is it enough to get to appropriate medical care?
4. Is the staff trained in oxygen first aid?
5. Do they have an emergency plan?

Let's work together to improve oxygen first aid preparedness in Asia-Pacific.



We present these cases to remind you that DAN is available 24/7 to answer questions, help with medical emergencies, arrange hyperbaric treatment and facilitate emergency evacuation through our 24-Hour Diving Emergency Hotlines.

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In the Nick of Time

Prompt evacuation and medical treatment prevents a serious injury from becoming a permanent impairment

By Bob Talbot



Labour Day in Roatán was beautiful – calm winds, clear skies and clear water. A little problem equalising didn't seem like a big deal.

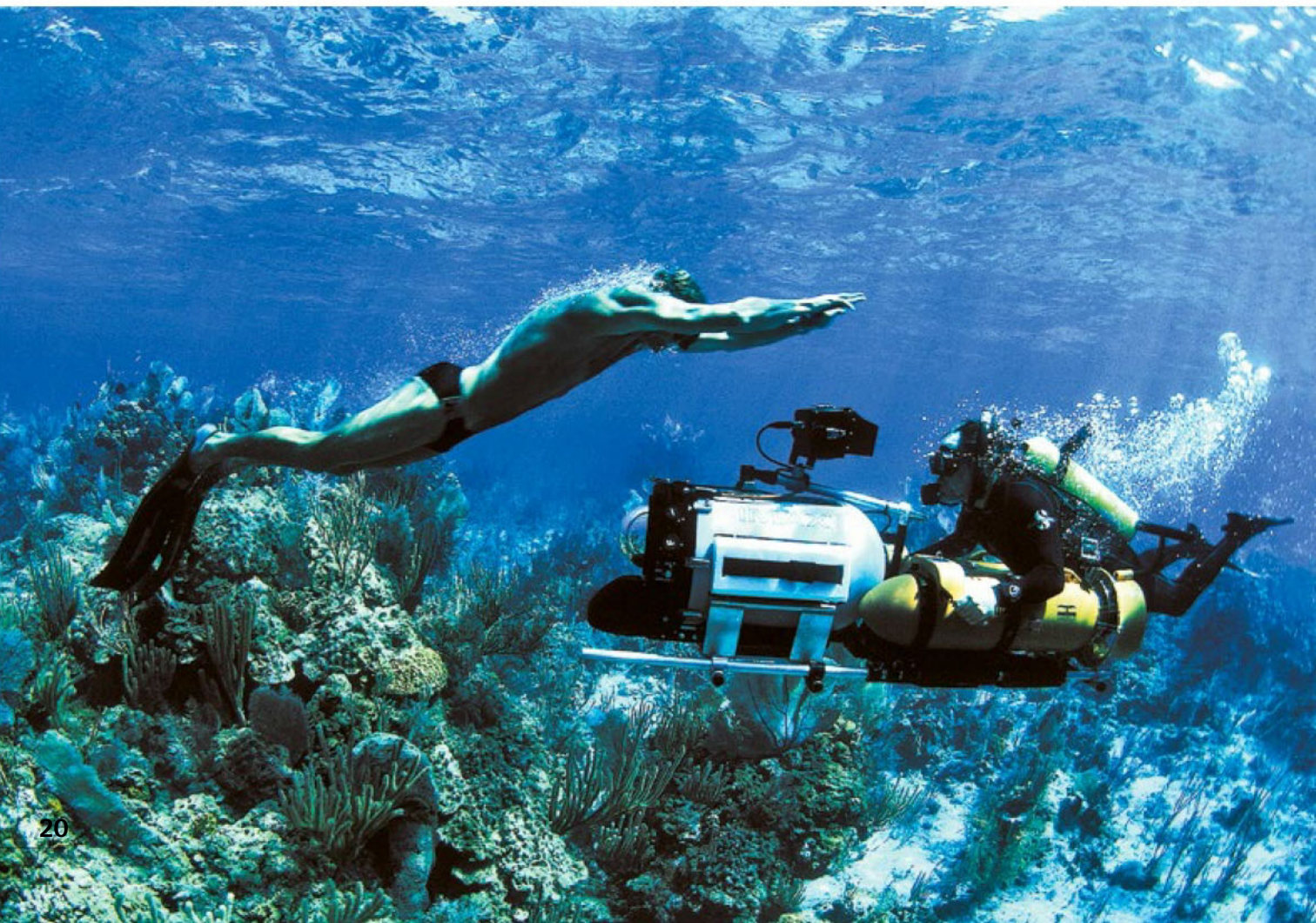
I was on the home stretch of filming *Ocean Men: Extreme Dive*, an IMAX film about freediving champions Umberto Pellizari and Pipin Ferraras. My team and I had just completed eight weeks of intensive underwater work in the Bahamas and a few days of shooting aerials in Miami. The production had spanned more than a year and had taken us to six countries.

We had filmed Umberto freediving through caves and Pipin winding through a wreck

teeming with sharks. We had made countless deep dives and had speedboats race over the camera just inches from the port. In Sardinia we placed Umberto on a 30-metre precipice with a helicopter, then we flew over him with the camera just clearing his head. In short, we had dodged a lot of bullets and were feeling confident that the worst was behind us when we arrived in Roatán.

After years of shooting wildlife, I thought directing a film centred on human subjects would be relatively simple. It wasn't. My desire to create an immersive experience that put the audience right there with the divers required a lot of deep diving that limited bottom time and

Image © Tim Calver



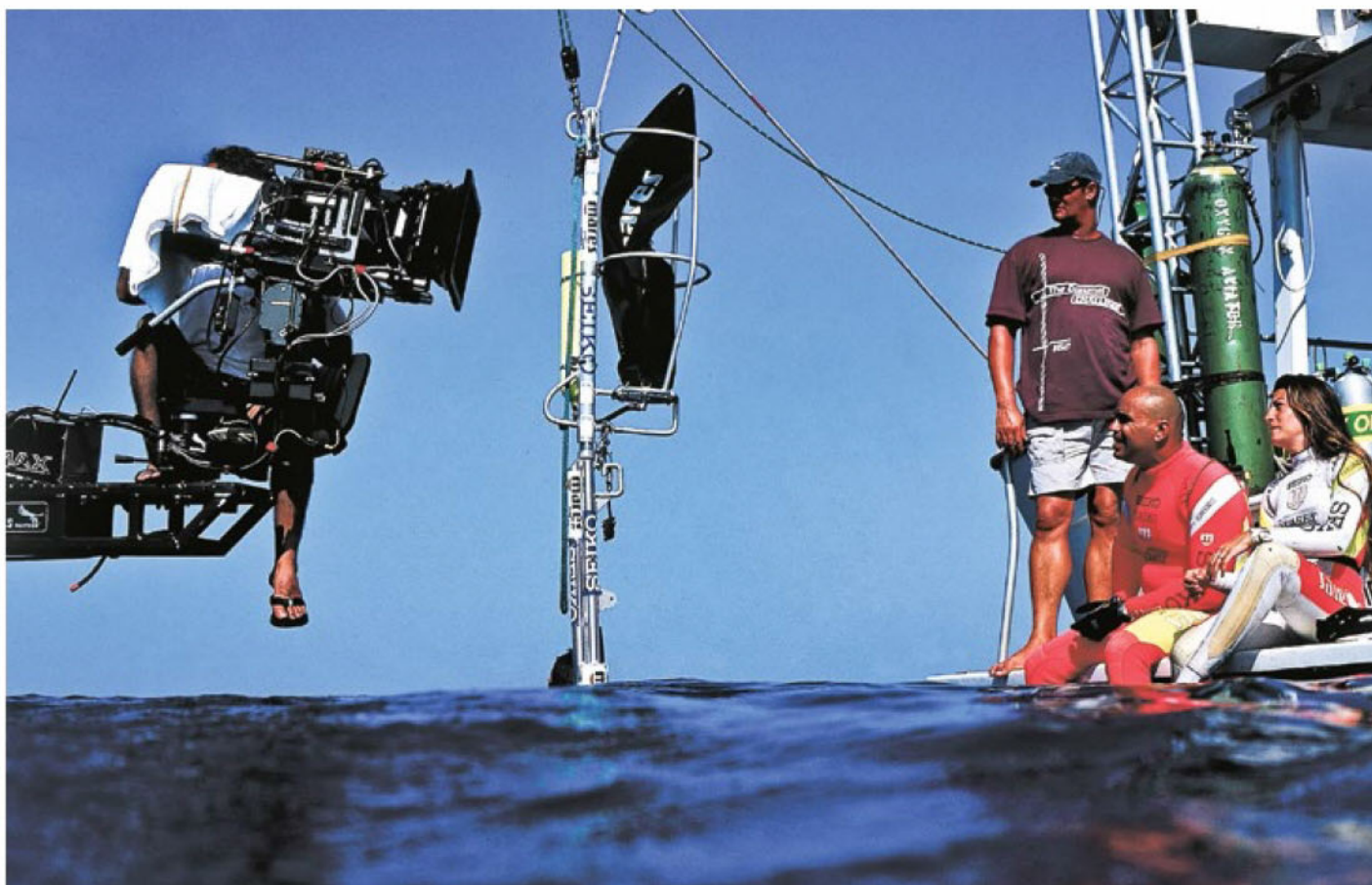


Image © Tim Calver

the number of dives we could make in a day. To keep the camera moving with the divers and the “no limits” sled, we had to create rigs that could handle the weight and mass of a 160-kilogram IMAX camera. With a camera that size, those rigs and everything that supported them had to be big and ponderous.

From the start, our production was plagued by technical problems. It was bad enough that a 1,000-foot magazine was good for only three and a half minutes of shooting. But when a camera failed on a 60-metre-plus dive, you were pretty much cooked for the day. Even with a lot of fall-back plans to shoot shallow or topside, camera failures cost us 40 percent of our shooting days. By the time we arrived at Anthony’s Key for the last five days of filming, I was really feeling the heat.

On our first day, we scouted and blocked shots. My ears gave me some trouble, but it was nothing I couldn’t push through. My team and I made our way from one dive site to another, carefully planning each scene. Most of the day we were on scuba. By the afternoon we were all freediving. At that point, my ears had become very stubborn. Unfortunately, so had I. In decades of diving, I had aborted only one dive

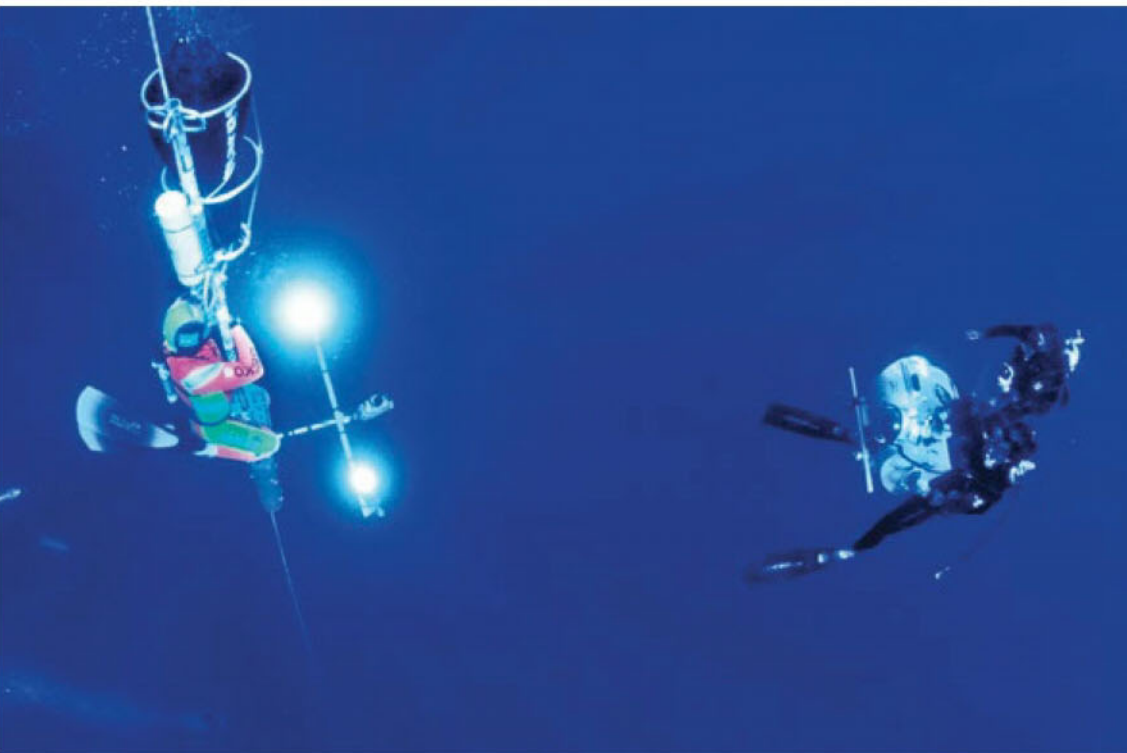
“He made it clear that with each passing hour the odds of me regaining any hearing diminished significantly.”

because I couldn’t clear. With so much on the line, I wasn’t about to let my ears slow us down now. I squeezed my nose tight and blew with everything I had.

I surfaced from a shallow dive feeling like my right ear was plugged. I shook my head a few times and kept diving. On the way back to the dock, the boat’s wake was loud and distorted, like plastic crackling in my ear. By dinner I had no hearing at all in my right ear. Deep in denial, I blew it off, sure that I would be fine the next day.

In the morning I still couldn’t hear a thing. I called my friend Thomas Balkany, M.D., a specialist in otolaryngology at the University of Miami. He knew a retired ear specialist on the island who was kind enough to come and check me out. After evaluating me, he was adamant that I get to Miami immediately.

Reluctant to leave the shoot, I called Dr. Balkany again. He made it clear that with each



The Medic's Perspective

Ear and sinus barotraumas are the most common injuries reported among divers. When a diver has difficulty equalising and develops symptoms, he should stop diving. As the diver in this case illustrated, continued diving can worsen the symptoms. It is rare for ear barotrauma to cause chronic or permanent injury, but your recovery can be affected by how quickly you seek treatment. Not diving on a holiday is disappointing, but the consequences of worsening symptoms can affect travel home and, potentially, future diving. An evaluation by a physician is an important next step. The diver in the story wisely sought medical advice. Whether you are at home or travelling, DAN can provide emergency assistance, medical advice and referrals to physicians.

— Marty McCafferty, EMT-P, DMT-A, DAN medical information specialist

Image © Tim Calver

passing hour the odds of me regaining any hearing diminished significantly. Our producer, Doug Merrifield, frantically called every commercial airline on the island trying to get me a flight to Miami. None was available until the following afternoon. Doug contacted DAN. The medical specialist at DAN immediately understood the urgency of the situation, and within hours I was aboard a chartered aircraft flying low to Miami.

Despite the fact he was leaving the country early the next morning, Dr. Balkany was waiting for me when I arrived at his office late that night. As he reviewed my audiogram, his expression said it all. The prognosis was poor: little if any chance of regaining hearing in that ear. Another doctor stopped by the office. He glanced at my audiogram and said to me, "Wow, I'm really sorry."

"You're looking at his good ear," Dr. Balkany said. I laughed, but in truth that was my lowest point.

The next morning one of Dr. Balkany's colleagues operated on my ear, patching the oval and round windows of my cochlea. Not allowed to fly, I spent a long week in a Miami hotel. I was shocked at how disorienting it was to be deaf in one ear. I had absolutely no sense of the direction from which sound was coming.

At the end of the week I went in for a follow-up audiogram. I was disappointed but not surprised to see that it was unchanged. I flew home to Los Angeles.

Three days later my son and I were getting ready to spray paint something in the front yard. I shook the can with my left hand until the mixing ball came loose then switched it to my right. I stopped mid-shake. My son asked me what was wrong. I shook the can again and smiled. That stupid little ball bouncing off the sides of the can was music to my injured ear.

I regained partial, distorted hearing, although with it came a wicked case of tinnitus. I haven't had a quiet moment in a very long time, but it's worth the hearing. Thanks to prompt treatment, I was able to continue my career as an underwater filmmaker, and every time I hear the direction of a whale's blow or the roar of surf in fog, I thank DAN for getting me off that island and Dr. Balkany for being there when I landed.

I often find myself repeating to my kids the lesson I learned from my pig-headed mistake: Nothing is a big deal until it is. Getting away with stupid risks and pushing limits empower us to do more boneheaded things until the odds catch up with us. If you're lucky, you'll only end up with a lifetime of ringing in your ear and the need to say "What?" a hundred times a day.

If you're smart, you'll avoid getting into trouble in the first place. And if you're really smart, you'll be sure to have DAN there to back you up.



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Photography by Hajime Ishikawa

Backplate Buoyancy Systems

These tools of tek divers are also useful for recreational divers, but one size does not fit all

Text by Pete Nawrocky



Look around any dive boat these days, and you'll see a great deal of variety when it comes to equipment configurations, ranging from traditional jacket-style BCDs to closed-circuit rebreathers. The reason is simple: Today's divers have a wealth of choices that give them the ability to customise their gear configuration for maximum comfort, safety and utility. One option that is increasingly popular among more experienced divers is the backplate buoyancy system.

Backplate systems consist of three basic components: a rigid (usually metal) plate, a harness system and a back-inflation air cell. These components can be mixed and matched to

fit a diver's unique body shape, or customised to the needs of the dive.

Florida cave diver Greg Flanagan has been credited with inventing the first backplate design in 1979. It was intended to prevent heavy twin cylinders from shifting during the dive, but the technical divers who adopted backplates found other advantages. In addition to rock-solid stability, simple harness systems left the diver's chest unencumbered and, when incorporated with a back-inflating air cell, they provided a more horizontal swimming position, while also providing ample lift without squeezing the diver. Of course, these are all benefits for recreational divers, too.

↓ Backplates are designed to be able to accommodate twin tanks and the needs of technical divers, but are gaining popularity with recreational divers as well
Image © Joseph C. Dovala



The important thing to consider when evaluating backplate systems is that they are endlessly customisable. No one size fits all divers, and no one configuration fits all dives. Thinking about a backplate system? Here are the basics to consider.

THE BACKPLATE

Typically made of stainless steel (although hard plastic and aluminium are options, too), the plate is designed to hold cylinders securely to the diver's back. Holes and slots cut into the plate allow for a variety of tank bands, harnesses and attachment points for accessories. Stainless-steel plates, which provide about three kilograms of negative buoyancy, are preferred by cold-water divers to help offset the positive buoyancy of drysuits and undergarments. Plastic and aluminium are often the preferred choice for travelling divers facing airline weight restrictions.

For divers considering a backplate system, it's important to try on the plate for size. The base of the plate should be even with the diver's waist and the top of the plate parallel with the top of the shoulder blades. This is a basic suggestion as various body shapes can alter the sizing. The most important thing is the diver's comfort. The length of a standard plate works well for most men; however, a woman's torso length is shorter compared with a man of equal height. A standard plate can be too long and press on the top of the buttocks, which is uncomfortable and interferes with the diver's fin kick. Shorter plates, which are now on the market, address this issue. Typically, they are made of aluminium since a diver needing this size generally does not need added ballast.

THE HARNESS

The original backplate systems featured a harness made from a single piece of five-centimetre webbing routed through the notches of the plate to form shoulder straps and ending in a belt cinched at the diver's waist. Most

“The important thing to consider when evaluating backplate systems is that they are endlessly customisable.”

divers also add a crotch strap to keep heavy tanks from shifting forward when swimming in a head-down position.

In the technical market, this is commonly referred to as a “Hogarthian Rig”, a reference to Bill Hogarth Main, the technical diver who popularised this simple and efficient configuration. Manufacturers also offer pre-built harnesses that include options like padding, quick-release buckles and multiple adjustment points.

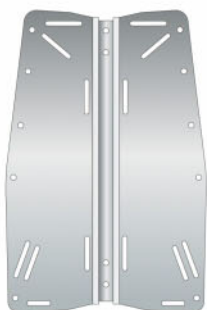
BACK-INFLATION AIR CELL

The ability to swap air cells to fit the diver and meet the demands of a specific dive is one of the most useful features of backplate buoyancy systems. Often called wings, back-inflation air cells are available in a variety of sizes, with lift capacity ranging from less than 14 kilos to more than 45 kilos. They come in two different styles.

The original and still-popular horseshoe style extends from the top of the tank down along the sides, while newer “donut” styles wrap completely around the tank (or tanks). The advantage of the “donut” is the easy transfer of air from one side of the wing to the other in any swimming position. A diver using a horseshoe wing may find air shifting to only one side of the wing if he is descending and leaning to one side when adding air to offset negative buoyancy. The additional air will move only to the highest point of the wing. Restoring balance requires moving to a slightly upright position. Some horseshoe wings use bungee cords to help control air movement.

Divers new to the concept of backplates are often surprised to learn that the amount of lift is not the main feature to consider when selecting a wing. More important is the size of the wing.

↓ A simple backplate system consists of three parts: the backplate, a harness and a back-inflation air cell.



The Backplate



The Harness



The Back-Inflation
Air Cell



The Combined System



↑ Rock-solid stability makes backplate systems the configuration of choice for technical divers, but they can also be used for single-tank recreational diving. By mixing and matching components, divers can customise their rig to suit the needs of any dive
Image © Joseph C. Dovala

Single-tank divers generally need a wing with approximately 14 kilos of lift. A diver wearing a set of double tanks will require a wing with approximately 30 kilos of lift. Even though the double tanks are not so negatively buoyant as to need this amount of lift, the width of these wings will position nicely along the edge of the tanks, enabling easier buoyancy control at depth and on the surface.

Individual body shape is the second feature to consider. A large, 1.8-metre diver wearing double tanks could use a wing with 30 kilos of lift and be very comfortable; however, an individual who stands 1.6 metres wearing the same configuration may feel the gear is diving them!

The shorter diver will be dealing with two problems. The wing will extend too low (over the buttocks) and will shift the diver to a head-down position. The extra material will also create drag, leading to unnecessary work. If the wing is too short (above the kidneys), the diver will be in a head-up or standing position, causing him to drag his feet.

A properly sized wing should extend no further than the end of an individual diver's torso. An overly large wing used on a single tank will wrap around the single tank when the diver is in the horizontal position. This "taco" effect will create a space for air that will not vent easily. Surface use of an oversized wing

will force the diver into a face-down position if the wing is fully inflated. An undersized wing, on the other hand, may mean the diver is unable to ascend easily from depth or float comfortably on the surface.

PROS AND CONS OF BACKPLATE SYSTEMS

So why use a backplate system? Maintaining trim and a horizontal swimming position is easier with back inflation and is the primary reason for selecting this style of dive gear. In a horizontal position, the diver's fins are off the bottom, which reduces silting that can damage coral or other sessile marine organisms. The simple harness of a backplate system leaves the chest area unencumbered, and inflating the wing doesn't create a feeling of squeeze. Women, in particular, have discovered that the versatility in plate sizes and the ability to rearrange straps to their torso shape allows for a better, custom fit.

The drawback in backplate systems is the tendency of back-inflation air cells to float the diver in the face-down position at the surface. This tendency is exaggerated if the diver is using a wing that is too long and/or is overinflated. Weights that are positioned in the front will also create this effect. Backplate divers will find swimming on their back is the most comfortable position at the surface.

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When Garbage Doesn't Die

How plastic debris is contaminating the world's oceans.

By Georgienne Bradley



Continental masses cause ocean currents to develop circular patterns, known as gyres, in each of the three major ocean basins. The North Pacific Gyre, formed by the southern currents off the coast of North America and the northern currents off the coast of Asia, is the world's largest.

As increasing amounts of plastic trash and debris find their way to sea, this natural phenomenon has become an area of concern. Over time, all floating waste from land migrates to the gyres, where it remains trapped – out of sight, out of mind, but not without adverse environmental consequences. The North Pacific Gyre is home to what many are now calling the Eastern Pacific Garbage Patch, a

concentration of plastic debris estimated to be nine metres deep and spread out over an area twice the size of Texas.

PLASTIC SOUP

The problem: Plastics don't break down naturally. Instead, they undergo a process of photo-degradation, in which sunlight causes the material to disintegrate into increasingly smaller pieces. Water samples taken from the garbage patch show stratified layers of plastic bits, including a cloudy mass of plankton-sized particles. "The gyre contains plastic in all states of degradation," says Capt. Charles Moore, who first discovered the problem. "It all combines in a sort of soup."

His was a rude awakening back in 1997. During a yacht race from Southern California to Hawaii, Moore veered off a normal heading and saw an ocean he barely recognised. He notes that within the gyre, "Every time I came on deck to survey the horizon, I saw a soap bottle, bottle cap or a shard of plastic waste bobbing by. Here I was in the middle of the ocean, and there was nowhere I could go to avoid the plastic." It was his personal wake-up call, and the Algalita Marine Research Foundation was born to address the perils of plastics pollution. His operational premise: "Industries reaping large profits from the creation of these plastic materials should be tasked with the challenge of recycling."

IN THE FOOD CHAIN

While large pieces of plastic debris are a well-documented threat to sea birds and turtles, the new concern is what is happening beneath the water's surface. Researchers worry that marine animals are mistaking the smallest plastic bits for plankton. As they ingest the plastic, the fear is that these polypeptides are working their way up the food chain. As a result, they may even be finding their way to our dinner tables in the tissue of tuna, mahi mahi and other culinary favourites. Early research suggests that degraded plastics create chemicals that mimic estradiol (a sex hormone). Agents such as bisphenol A, commonly abbreviated as BPA, and a whole gamut of other harmful synthetic polymers contained in plastics have been shown to interfere with critical aspects of metabolic activity in humans.

↓ Left to right: James Leichter, Miriam Goldstein and Doug Woodring display the debris recovered during Project Kaisei's SEAPLEX expedition to the Eastern Pacific Garbage Patch





ALGALITA MARINE RESEARCH FOUNDATION

www.algalita.org

Capt. Charles Moore, the man credited with discovering the Eastern Pacific Garbage Patch, founded the Algalita Marine Research Foundation with the goal of protecting the marine environment through research and education. The foundation has released an educational DVD series titled *The Synthetic Sea Story*; it traces the history of research on plastic debris in the world's oceans.

PROJECT KAISEI

www.projectkaisei.org

The project focuses on both prevention and cleanup of marine debris. During their most recent expedition, scientists performed critical research and returned with powerful imagery to demonstrate the problem. The crew also experimented with a variety of potential cleanup solutions.

NOAA

www.marinedebris.noaa.gov/info/patch.html

Focused on removal operations, the National Oceanic and Atmospheric Administration (NOAA) is working to use oceanographic information to help predict the areas of convergence where debris likely concentrates. A better understanding of these processes will provide enough confidence for cost-effective, successful cleanup efforts.

PLASTIC POLLUTION COALITION

www.plasticpollutioncoalition.org

The coalition provides a platform for individuals and institutions to share resources and coordinate efforts, explore synergies and strategize together to reduce plastic pollution.

DIVE INTO YOUR IMAGINATION

www.diveintoyourimagination.com/news/the-garbage-patch

Dive Into Your Imagination is changing the way a new generation views oceans. During a recent SEAPLEX expedition for Project Kaisei, founder Annie Crawley helped document the North Pacific Gyre and has created an excellent online blog on the science of the garbage patch.

BE PART OF THE SOLUTION

Challenges to cleaning up the growing mass of plastics in the world's oceans are many, including the great distance from land, the nebulous nature of this slurry and seasonal rough seas. Despite these setbacks, scientists and environmental groups have proposed a variety of solutions. An obvious solution in the minds of some environmentalists is banning disposable plastic bags and creating awareness about superfluous packaging.

"The best way to stop this problem is to refuse plastics when offered," says Daniella Russo, executive director and co-founder of the Plastic Pollution Coalition (PPC). In the end, there are those tasked with cleaning up this mess of epic proportions, and to that we have to look to governmental agencies like the National Oceanic and Atmospheric Administration (NOAA) to take the lead.

There is also the more strategic and personal means of proactive resolution. We have to collectively reduce our "plastic footprint". We know that from looking at our landfills. Now we know that from sailing our seas.

↑ The abundance of tiny plastic particles, which can be ingested by marine life, is a growing concern

WHAT DIVERS CAN DO

The magnitude of the plastic problem may leave many divers feeling helpless; however, small steps to reduce plastic waste do help. Here are some tips:

Switch Bags

Make plastic use a conscious decision. Look around: Everything from apples to CDs to individual slices of cheese comes wrapped in plastic. Whenever possible, choose plastic alternatives or reusable options; that includes paper bags and reusable cloth grocery bags. Unless absolutely necessary, skip the plastic produce bags. If you must use a disposable plastic item, make sure you recycle the plastic. Many grocery stores have a recycling bin for plastic bags.

Replace Bottles

Bring your own aluminum or steel water bottle to the office, gym or when you travel. If you do need to purchase bottled water, be sure to recycle the bottle.

Request a "For-Here" Cup

Coffee bars are usually set up to dispense your java in paper cups with plastic lids. If you're not on the run, ask that yours be served in a ceramic mug. If you are on the run, bring your own reusable mug.

Get Involved

Educate yourself, and share what you learn with friends, starting with your own tips on how to reduce plastic waste.

Maintain Your Gear

Develop good habits for safety, and extend the life of your dive gear

Text by Colby Cline
Photos by Stephen Frink



You've finally booked your next dive trip, and you can't wait to relax into the cool, blue depths. But a nagging thought creeps into your mind: "Will my dive gear perform as expected?" You remember your last trip when your alternate second-stage began to free flow just as you were about to get in the water. The captain quickly replaced the hissing regulator, but he said he noticed some corrosion and sand, which probably caused the free flow. That dive was saved, but you worry your equipment might act unpredictably again.

Remember that your dive gear is life-support equipment – designed to help you breathe, see and control your movement underwater. To be confident your gear will function properly, you should develop a few important habits.

RINSE

First, thoroughly rinse all your dive gear in clean fresh water after every dive or at least after every day of diving. This is especially true when diving in the ocean; rinsing away as much salt as possible will help keep the equipment functioning as intended. After rinsing, allow gear to dry completely in a cool, shady and well-ventilated area before you put it away.

↑ When rinsing your regs, be sure your dust cap is firmly secured

→ Adding a little air to your BCD while rinsing the bladder will help the water to better eliminate any salt crystals

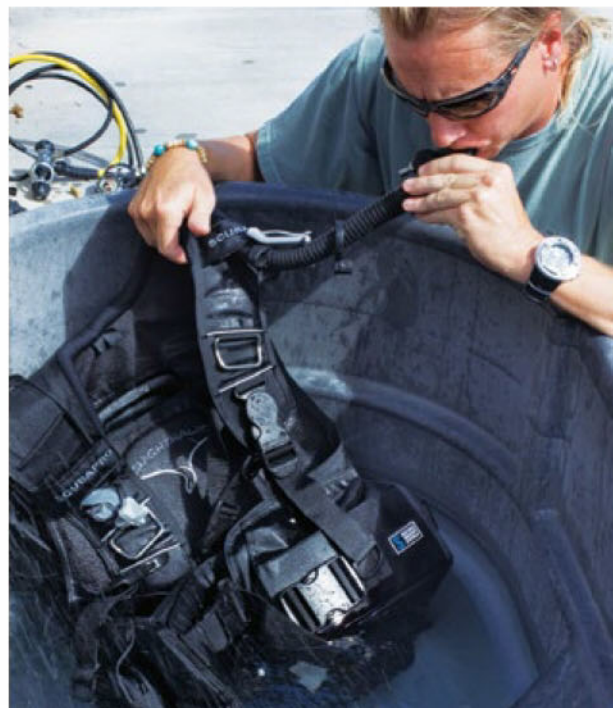
SHADE

Always be conscious of your gear's exposure to the sun. Ultraviolet (UV) radiation can be very damaging to dive equipment. Some exposure to the sun may be inevitable, but the more you can limit it, the better. On the way to a dive site, store your gear in the shade if possible. If there isn't any shade available, cover your equipment with a towel.

Here are some recommendations on how to care for specific pieces of dive gear to maximise their longevity and reliability.

MASK, SNORKEL, FINS AND COMPUTER

Treat these items carefully so they aren't crushed by heavier gear. It's also a good idea to keep this equipment (as well as the rest of your gear) well organised to minimise the risk of it getting stepped on or kicked overboard. After rinsing and drying these items, store them properly. The box that came with your mask, for example, will help prevent other equipment from crushing or deforming the lenses or silicon skirt. Remember to check the battery icon on your dive computer, and replace the battery as needed.



WETSUIT, BOOTS, GLOVES AND HOOD

Neoprene can be especially susceptible to UV damage, so take extra care to keep your wetsuit and other neoprene items in the shade. If your wetsuit takes on an unpleasant odour, add some wetsuit shampoo to the post-dive rinse tub. After rinsing, hang your wetsuit inside out on a wetsuit hanger, and allow it to dry completely before you turn it right side out. If it's possible to turn your gloves and hood inside out as well, do so. Check the manufacturer's recommendations on wetsuit zipper maintenance; some require periodic lubrication.

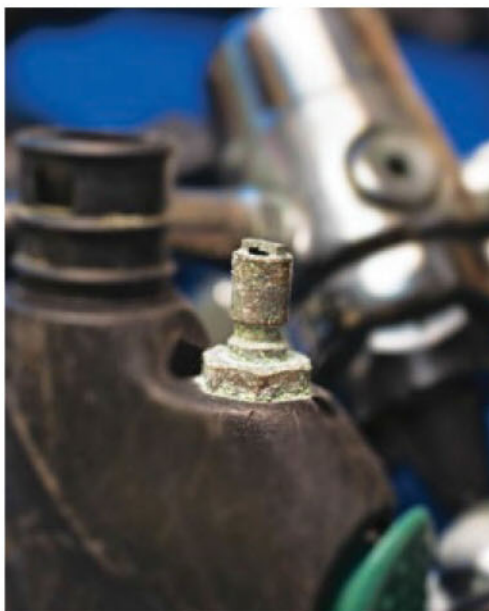
REGULATOR

Test your regulator's function as soon as possible after you board a dive boat so you can address any problems before you get too far from the dive shop. If possible, clean your regulator assembly while it's still connected to a scuba cylinder and pressurised. Soak the components for several minutes to allow the fresh water to dissolve the salt in all the nooks and crannies. If the system is pressurised, purge both second stages several times while they're submerged in clean, fresh water to promote removal of contaminants from their interiors. If it's not possible to soak the regulators while they're connected to a cylinder, make sure the dust cap is firmly in place so water is prevented from entering the first stage. Also, take care to not press the purge buttons as that can allow water to enter the hoses and possibly reach the first stage.

Once the second stages are adequately soaked, shake off any excess water and set them out to dry. If your second stages are equipped with knobs for controlling breathing resistance, turn them all the way out to decrease the spring tension on the internal components. Once the regulator assembly is completely dry, store it in a regulator bag to keep dust, debris and pests away from your vital breathing equipment. Follow the manufacturer's recommendations on how often to have your regulators serviced by a professional technician – an annual overhaul is a good idea.

BCD

As with your regulators, test your BCD before diving to make sure everything is working properly. When soaking your BCD after diving, press down on the inflate and deflate buttons while holding the BCD underwater to work out any trapped salt, sand or debris that might be inside. Orally inflate the jacket and, while it's submerged, pull on each of the dump valves to work out any debris that might be trapped



← Don't ever forget that your dive gear is life-support equipment. Keep it in good working order by rinsing it thoroughly at the end of every day of diving, inspecting it before and after you dive, getting it serviced regularly and handling it with care

around them. Be sure to rinse out the inside of the BCD bladder – sometimes salt water will enter in the process of deflating the BCD while diving. Using a hose, introduce clean fresh water into the bladder as you hold down the deflate button. Next, fill it with air by mouth. Hold up the BCD and rotate it so the fresh water sloshes around inside and coats all the interior surfaces of the bladder. Hang the BCD on an appropriately sturdy hanger and pull the lowest dump valve (or hold the BCD upside down and press the deflate button) to allow all the water to escape. Repeat until you are confident that little or no water remains inside, and then partially inflate the jacket for storage. Again, the manufacturer will provide a recommendation on how often to have your BCD serviced; dropping it off at your local dive shop every year with your regulator assembly should ensure it works reliably.

CYLINDER

Always handle pressurised cylinders carefully as they contain a lot of potential energy. To prevent the incursion of water, never drain a cylinder completely of gas. When rinsing your cylinder after diving, thoroughly rinse around the valve, and remove the tank boot regularly to prevent buildup of salt or other debris. Remember to have your cylinder visually inspected every year and hydrostatically tested every five years.

It doesn't take much time or effort to ensure your life-support equipment will work as intended. Proper care and regular maintenance of your dive gear is an important way to stack the deck in your favour.

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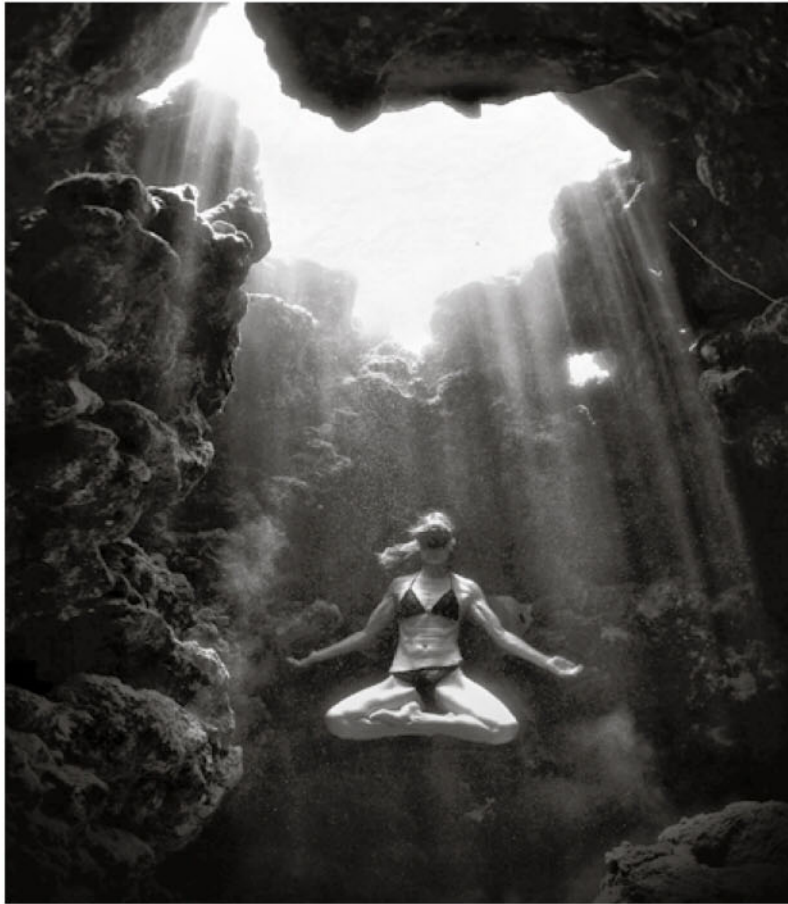
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Jacques de Vos South Africa

At the end of 2007 while enjoying 'days off' from his position as an engineer in the oilfield services, Jacques de Vos was inspired by his scuba instructor (also a talented underwater photographer) to purchase his first underwater compact camera and Ikelite housing. Since then he has qualified as a SCUBA instructor and Commercial Diver, and upgraded through numerous camera systems. He now shoots both stills and video and has developed the skill set to do all of this while freediving.



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